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Oklahoma Univ, Norman Science and Public Policy Program

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Energy from the West

Energy Resource Development Systems Report Volume I: Introduction and General Social Controls

Interagency Energy/Environment R&D Program Report

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ABSTRACT

This report describes the technologies likely to be used for development of coal, oil shale, uranium, oil, natural gas, and geothermal resources in eight western states (Arizona, Colorado, Montana, New Mexico, North Dakota, South Dakota, Utah, and Wyoming). It is part of a three-year "Technology Assessment of Western Energy Resource Development." The study examines the development of these energy resources in the eight states from the present to the year 2000. Other reports describe the analytic structure and conduct of the study, the impacts likely to result when these resources are developed, and analyze policy problems and issues likely to result from that development. The report is published in six volumes. Volume 1 describes the study, the technological activities such as exploration, extraction, and conversion for developing the resource, and laws and regulations which affect the development of more than one of the six resources considered in the study. The remaining five volumes are resource specific: Volume 2, Coal; Volume 3, Oil Shale; Volume 4, Uranium; Volume 5, Oil and Natural Gas; and Volume 6, Geothermal. Each of these volumes provides information on input materials and labor requirements, outputs, residuals, energy requirements, economic costs, and resource specific state and federal laws and regulations.

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Volume I: Introduction and General Social Controls

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Energy
from
the
West

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FORWARD

The production of electricity and fossil fuels inevitably impacts Man and his environment. The nature of these impacts must be thoroughly understood if balanced judgements concerning future energy development in the United States are to be made. The Office of Energy, Minerals and Industry (OEMI), in its role as coordinator of the Federal Energy/Environment Research and Development Program, is responsible for producing the information on health and ecological effects - and methods for mitigating the adverse effects - that is critical to developing the Nation's environmental and energy policy. OEMI's Integrated Assessment Program combines the results of research projects within the Energy/Environment Program with research on the socioeconomic and political/institutional aspects of energy development, and conducts policy - oriented studies to identify the tradeoffs among alternative energy technologies, development patterns, and impact mitigation measures.

The Integrated Assessment Program has supported several "technology assessments" in fulfilling its mission. Assessments have been supported which explore the impact of future energy development on both a nationwide and a regional scale. Current assessments include national assessments of future development of the electric utility industry and of advanced coal technologies (such as fluidized bed combustion). Also, the Program is conducting assessments concerned with multiple-resource development in two "energy resource areas":

- Western coal states
- Lower Ohio River Basin

This report, which describes the technologies likely to be used for developing six energy resources in eight western states, is one of three major reports produced by the "Technology Assessment of Western Energy Resource Development" study. (The other two reports are an impact analysis report and a policy analysis report.) The report is divided into six volumes. The first volume describes the study, the organization of this report and briefly outlines laws and regulations which affect the development of more than one of the six resources considered in the study. The remaining five volumes are resource specific and describe the resource base, the technological activities such as exploration, extraction and conversion for developing the resource, and resource specific laws and regulations. This report is both a compendium of information and a planning handbook. The descriptions of the various energy development technologies and the extensive compilations of technical baseline information are written to be easily understood by laypersons. Both professional planners and interested citizens should find it quite easy to use the information presented in this report to make general but useful comparisons of energy technologies and energy development alternatives, especially when this report is used in conjunction with the impact and policy analysis reports mentioned above.

Your review and comments on these reports are welcome. Such comments will help us to improve the usefulness of the products produced by our Integrated Assessment Program.

Steven Reznek

Steven R. Reznek

Acting Deputy Assistant Administrator
for Energy, Minerals and Industry

PREFACE

This Energy Resource Development System (ERDS) report has been prepared as part of "A Technology Assessment of Western Energy Resource Development" being conducted by an interdisciplinary research team from the Science and Public Policy Program (S&PP) of the University of Oklahoma for the Office of Energy, Minerals and Industry (OEMI), Office of Research and Development, U.S. Environmental Protection Agency (EPA). This study is one of several conducted under the Integrated Assessment Program established by OEMI in 1975. Recommended by an interagency task force, the purpose of the Program is to identify economically, environmentally, and socially acceptable energy development alternatives. The overall purposes of this particular study were to identify and analyze a broad range of consequences of energy resource development in the western U.S. and to evaluate and compare alternative courses of action for dealing with the problems and issues either raised or likely to be raised by development of these resources.

The Project Director was Irvin L.(Jack) White, Assistant Director of S&PP and Professor of Political Science at the University of Oklahoma. White is now Special Assistant to Dr. Stephen J. Gage, EPA's Assistant Administrator for Research and Development. R. Leon Leonard, now a senior scientist with Radian Corporation in Austin, Texas, was a Co-Director of the research team, Associate Professor of Aeronautical, Mechanical, and Nuclear Engineering and a Research Fellow in S&PP at the University of Oklahoma. Leonard was responsible for editing and managing the production of this report. EPA Project Officer was Steven E. Plotkin, Office of Energy, Minerals and Industry, Office of Research and Development. Plotkin is now with the Office of Technology Assessment. Other S&PP team members are: Michael A. Chartock, Assistant Professor of Zoology and Research Fellow in S&PP and the other Co-Director of the team; Steven C. Ballard, Assistant Professor of Political Science and Research Fellow in S&PP; Edward J. Malecki, Assistant Professor of Geography and Research Fellow in S&PP; Edward B. Rappaport, Visiting Assistant Professor of Economics and Research Fellow in S&PP; Frank J. Calzonetti, Research Associate (Geography) in S&PP; Timothy A. Hall, Research Associate (Political Science); Gary D. Miller, Graduate Research Assistant (Civil Engineering and Environmental Sciences); and Mark S. Eckert, Graduate Research Assistant (Geography).

Chapters 3-7 were prepared by the Radian Corporation, Austin, Texas, under subcontract to the University of Oklahoma. In each of these chapters, Radian is primarily responsible for the description of the resource base and the technologies and S&PP is primarily responsible for the description of laws and regulations. The Program Manager at Radian was C. Patrick Bartosh. Clinton E. Burklin was responsible for preparation of these five chapters. Other contributors at Radian were: William R. Hearn, Gary D. Jones, William J. Moltz, and Patrick J. Murin.

Additional assistance in the preparation of the ERDS report was provided by Martha W. Gilliland, Executive Director, Energy Policies Studies, Inc., El Paso, Texas; Rodney K. Freed, Attorney, Shawnee, Oklahoma; and Robert W. Rycroft, Assistant Professor of Political Science, University of Denver, Denver, Colorado.

ABSTRACT

This report describes the technologies likely to be used for development of coal, oil shale, uranium, oil, natural gas, and geothermal resources in eight western states (Arizona, Colorado, Montana, New Mexico, North Dakota, South Dakota, Utah, and Wyoming). It is part of a three-year "Technology Assessment of Western Energy Resource Development." The study examines the development of these energy resources in the eight states from the present to the year 2000. Other reports describe the analytic structure and conduct of the study, the impacts likely to result when these resources are developed, and analyze policy problems and issues likely to result from that development. The report is published in six volumes. Volume 1 describes the study, the technological activities such as exploration, extraction, and conversion for developing the resource, and laws and regulations which affect the development of more than one of the six resources considered in the study. The remaining five volumes are resource specific: Volume 2, Coal; Volume 3, Oil Shale; Volume 4, Uranium; Volume 5, Oil and Natural Gas; and Volume 6, Geothermal. Each of these volumes provides information on input materials and labor requirements, outputs, residuals, energy requirements, economic costs, and resource specific state and federal laws and regulations.

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Rodney K. Freed, Robert W. Rycroft, and R. Leon Leonard had primary responsibility for preparation of this volume of the Energy Resource Development Systems (ERDS) Report. All three worked on the volume while members of the Science and Public Policy interdisciplinary research team. Freed is now an attorney in Shawnee, Oklahoma. Dr. Rycroft is now an Assistant Professor at the University of Denver. Dr. Leonard is now a senior scientist with the Radian Corporation, Austin, Texas.

The research reported here could not have been completed without the assistance of a dedicated administrative support staff. Members of the staff are an integral part of the interdisciplinary team approach employed by the Science and Public Policy Program. This staff is headed by Janice Whinery, Assistant to the Director, and Nancy Heinicke, Clerical Supervisor. Staff members are: Cyndy Allison, Ellen Ladd, Julia Leonard, Patti Mershon, Pam Odell, Brenda Skaggs, and Judy Williams.

The research support staff is headed by Martha Jordan, Librarian. Research Team Assistants are David Sage, Mary Sutton, and Diane Dean. Lorna Caraway and Phil Kabrich assisted as Research Team Assistants in the final production of this volume.

Nancy Ballard, graphics arts consultant, designed the title page.

Steve E. Plotkin, Environmental Protection Agency Project Officer, has provided continuing support and assistance in the preparation of this report.

A number of individuals listed below participated in the review of this volume of the ERDS Report and provided information for its preparation. Although these critiques were extremely helpful, none of these individuals is responsible for the content of this volume. This volume is the sole responsibility of the Science and Public Policy interdisciplinary research team conducting this study.

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CHAPTER 1

ENERGY RESOURCE DEVELOPMENT SYSTEMS

1.1 INTRODUCTION

1.1.1 Relation to the Rest of the Study

This Energy Resource Development System (ERDS) report is a part of a three-year "Technology Assessment of Western Energy Resource Development." The assessment is being performed for the office of Energy, Minerals and Industry, Office of Research and Development, U.S. Environmental Protection Agency by an interdisciplinary research team from the Science and Public Policy Program (S&PP), University of Oklahoma, with the major part of the work on the ERDS performed under subcontract by the Radian Corporation in Austin, Texas.

The overall purpose of the study is to attempt to determine what the consequences of western energy resource development will be and what can be done about them. Specific objectives are to:

- Identify and describe development alternatives;
- Determine and analyze impacts;
- Identify and define policy problems and issues;
- Identify, evaluate, and compare alternative policies and implementation strategies;

- Identify and describe research and data needs.

The study focuses on the development of six energy resources in the eight-state study area and at the six sites shown in Figure 1-1. Coal, oil shale, uranium, oil, natural gas and geothermal are the six energy resources being considered; the technological alternatives being assessed for developing them are identified in Table 1-1 and are described in detail in this report. The time period during which the consequences of development are being assessed extends to the year 2000.

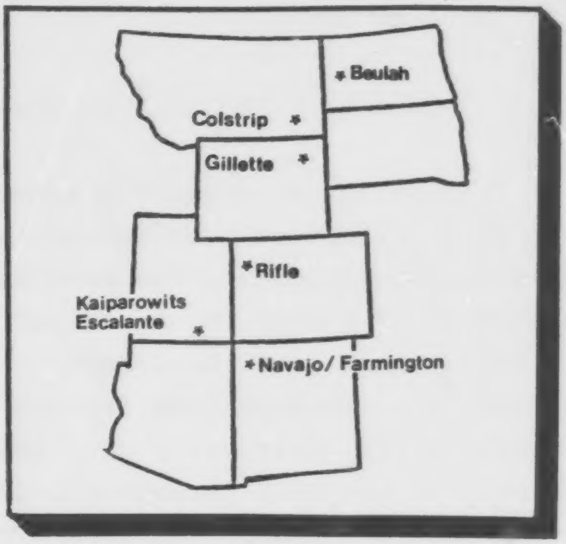

FIGURE 1-1: THE EIGHT-STATE STUDY AREA AND SIX SITES

The impacts likely to occur when these technologies are deployed at specific sites and to produce specified quantities of energy on a region-wide basis are analyzed and results reported in Energy From the West: Impact Analysis Report.[1] The problems and issues likely to arise as a consequence of this development and results of an analysis of alternative policies and strategies for dealing with them are reported in Energy From the West: Policy Analysis Report.[1] An overall description of the relationship among these reports and how the study was conducted can be found in the work plans for the study.[2]

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[1] Results of the impact analysis are given in White, Irvin L., et al. Energy From the West: Impact Analysis Report. Washington, D.C.: U.S., Environmental Protection Agency, forthcoming. Preliminary results may be found in White, Irvin L., et al. Energy From the West: A Progress Report of a Technology Assessment of Western Energy Resource Development, 4 vols. and Executive Summary. Washington, D.C.: U.S., Environmental Protection Agency, 1977. (NTIS Order Nos.: Vol. I, PB-271 752, Vol. II, PB-271 753; Vol. III, PB-271 754; Vol. IV PB-272 243.)

1.2 OBJECTIVES OF THE ERDS DOCUMENT

This description of the ERDS considered in the Western Energy Study characterizes the energy resources, describes the technologies required to develop those resources, identifies inputs, products and residuals for these technologies, and discusses the social controls (rules and regulations or institutional frameworks) which are applied when these technologies are deployed.

TABLE 1-1: DEVELOPMENT ALTERNATIVES

- Coal:
  - Surface and Underground Mining
  - Direct Export by Unit Train and Slurry Pipeline
  - Electric Power Generation
  - Gasification
  - Liquefaction
  - Transportation by Pipeline and EHV
- Oil Shale:
  - Underground Mining
  - Surface Retorting
  - Modified In-Situ
  - Transportation by Pipeline
- Uranium:
  - Surface and Solutional Mining
  - Milling
  - Transportation by Train
- Oil and Natural Gas:
  - Conventional Drilling and Production
  - Enhanced Oil Recovery
  - Transportation by Pipeline
- Geothermal:
  - Hot Water and Hot Rock
  - Electric Power Generation
  - Transportation by EHV

EHV = extra-high voltage

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[1] White, Irvin L., et al. Energy From the West: Policy Analysis Report. Wasnington, D.C.: U.S., Environmental Protection Agency, forthcoming.

[2] White, Irvin L., et al. First Year Work Plan for a Technology Assessment of Western Energy Resource Development. Washington, D.C.: U.S., Environmental Protection Agency, 1978.

The objective of the ERDS is to provide this descriptive information as a data base for the assessment in a manner which will be useful to policymakers, administrators, and the general public. The purpose is not to provide detailed analytical data for scientists and engineers. However, in most instances, these descriptions do provide a data base for those who might wish to replicate the analyses performed in the technology assessment. They also provide information for determining the products and residuals or byproducts from the energy developments considered in the study.

An effort has been made to provide up-to-date citations to the technical literature as of the end of 1977. Of course, no attempt to summarize the breadth of technologies described in the ERDS can be entirely comprehensive. The data base is sometimes not complete and is often subject to varying interpretations. However, the document has been extensively reviewed by those active with the resources and technologies involved to assure that it is as up-to-date and accurate as possible.

1.3 ORGANIZATION OF THE ERDS DOCUMENT

Chapter 2 provides a brief outline of those laws and regulations applicable to more than one energy resource. The remaining chapters focus on specific ERDS for coal, oil shale, oil, natural gas, geothermal and uranium describing the technologies, and resource specific social controls.

1.3.1 General Social Controls

The existing legal, administrative and regulatory arrangements, termed "social controls," discussed in Chapter 2 range from the requirements which must be met prior to undertaking development activities, through the deployment of specific technologies, to the regulation of the impacts resulting from energy developments. State and federal controls in the following categories are included: environmental impact statement requirements; siting and land use; resource exploration; resource acquisition (leasing); resource extraction (mining or drilling); occupational health and safety; air quality; water quality; water use; solid waste disposal; noise pollution; and transportation and distribution. These categories are not assumed to be sequential development steps. They are, instead, laws and regulations affecting the most significant energy policy issues faced during development. As such, they have gaps and overlaps.

At the federal level, the emphasis is on describing the legal framework (the legislative history and underlying statutory bases of federal controls), the administrative authority (an identification of the responsible federal agencies and their functions), and the regulatory provisions (relevant permits, procedures, and standards of enforcement for the federal government and the special jurisdiction of Indian lands). At the state level, the applicable laws, responsible agencies and regulations for each of the eight western states (Arizona, Colorado, Montana, New Mexico, North Dakota, South Dakota, Utah, and Wyoming) are identified and discussed. Local laws and regulations have not been included. Wherever appropriate, Chapter 2 describes gaps and overlaps in federal and state controls as well as the legal and administrative problems raised by special cases such as development in Indian lands. However, the discussion of general social controls emphasizes statutory requirements and does not elaborate those procedures which have developed through the interpretation of common law.

1.3.2 Energy Resource Development Systems

Chapters 3 through 7 are development system descriptions for the six energy resources considered in the study. The ERDS chapters are organized with an introduction, a description of the resource base for the region and the nation as a whole, and a description of technological activities including exploration, extraction (mining or production) and conversion. Transportation technologies are not considered. Each of these technological activities (e.g., exploration) is, in turn, subdivided into a description of the technologies likely to be used, the inputs (such as labor, capital and water requirements), the outputs and residuals (such as electricity, car emissions and water effluents), and social controls (laws and regulations) specific to that resource. The following discussion briefly provides definitions and a description of the content of each of these subdivisions.

1.3.2.1 Resource Base Description

The resource base section of the ERDS characterizes the resource by describing: the "total resources" (the amount of energy resource within the U.S. or western region, including amounts not identified, but surmised to exist); the "total reserves" (the amount of known resources which are economically recoverable using currently available technology); the chemical and physical characteristics (for example, the sulfur content or the seam thickness of a resource); and the location and ownership of the resource (geographical location, and federal, state or private ownership, etc.).

1.3.2.2 Technological Activity Descriptions

The sections describing technological activities identify and outline the sequence of processes required to develop a resource. In the oil ERDS, for example, three activities are involved: exploration, production, and transportation. Each activity is described in terms of its construction and operation. For each activity, "technological alternatives" (exploratory drilling, for example) are described which represent one or more of the hardware or procedural options which might be deployed. A combination of technological alternatives is termed a "trajectory" (the sequence of getting a resource to the demand point). A trajectory which might be deployed in the West would include exploratory drilling, underground coal mining, on-site conversion to electricity using a conventional steam power plant with stack gas scrubbers, and transmission using extra high voltage lines.[1]

1.3.2.3 Descriptions of Inputs and Outputs

Sections describing the input requirements and products and "residuals" (byproducts), of a technology are included for each technological activity. Defined broadly, residuals include both the inputs and outputs of an activity. Important inputs are manpower needs, water requirements, or land requirements. Outputs include such things as air emissions, water effluents, and solid wastes. The quantities of residuals are expressed both in terms of the amounts per day for facilities of a standardized size and per unit of energy.

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[1] A comprehensive summary of alternatives for energy resource development is found in Kash, Don E., et al. Energy Alternatives: A Comparative Analysis. Washington, D.C.: Government Printing Office, 1975.

In addition to the delineation of important residuals, the descriptions of inputs and outputs of technological activities include consideration of energy efficiency and economics. The energy efficiency is the ratio of the energy output of a process to the sum of the energy input in fuel or raw resource and the amount of energy required from external sources. The energy efficiency provides a basis for comparing technological alternatives.

Economic considerations are limited to an identification of capital, operating and total costs. Capital costs are those for the construction or purchase of land, facilities and equipment. Operating costs include, among other factors, labor, materials, and maintenance. As used in this document, total costs are simply the sum of the capital and operating costs. Where appropriate, the costs of output fuels are also included in the economic descriptions of inputs and outputs.

1.3.2.4 Social Controls Descriptions

The descriptions of resource-specific social controls contain the same types of information (laws, agencies, rules, and procedures) found in Chapter 2. However in the resource-specific chapters, these controls are described according to the specific jurisdiction (federal, Indian, or state) in the sequence of development (exploration through transportation). Thus, in the oil ERDS, the social controls for oil exploration on federal, state, and Indian lands are followed by a discussion of the controls on oil leasing.

1.4 LIMITATIONS OF THE ERDS DOCUMENT

It is important to recognize the inherent difficulties involved in describing energy resource development systems. First, the data provided in this document are selective; not all available information could be utilized in this report. Frequently, in this selection process, more qualitative data was included. Consequently, the full context of energy development in terms of quantitative data may not be apparent. Second, many categories and specific bits of information are not available. In many instances, this document merely reports residuals, for example, as "negligible" or as only a dashed line. And where data does exist, much of it is based on extrapolations from either a limited number of cases or from cases of a different scale (from pilot plant projects, for example). In either instance, the data may not accurately represent cases in different locations or under different parameters. Third, most of the computations in this study are based on specific assumptions which may differ widely from those used in different analyses. Most residuals data, for example, assume certain configurations of control technologies which prevent or eliminate water effluents. And most of the data are based on specific input requirements or materials (such as coal from a particular seam). Thus, comparisons using this data must be approached with caution. Assumptions which may affect the residuals data are indicated in each chapter.

Finally, it must be noted that the entire energy resource development area is one which is subject to rapid technological and social change. Not only are the specific technological alternatives subject to breakthroughs, but the network of social controls has been a target of frequent reorganizations. The creation of the Department of Energy is the latest restructuring considered in this document.

The following chapter discusses the generally applicable laws and regulations, and the subsequent six chapters discuss coal, oil shale, uranium, oil, gas, and geothermal respectively.

CHAPTER 2

GENERAL SOCIAL CONTROLS

2.1 INTRODUCTION

This chapter describes those social controls (laws and regulations) applicable to more than one energy resource. The emphasis is on federal and state legal, administrative and regulatory arrangements, but Indian controls are also described where appropriate. No effort was made to identify local ordinances which may affect development. The presentation is somewhat uneven among the various control categories. Air and water quality regulations are outlined in more detail than are beneficial water uses and solid waste disposal standards. The unevenness reflects the stage of governmental involvement in the promulgation of rules and regulations.

2.2 ENVIRONMENTAL IMPACT STATEMENTS

The procedural requirement of section 102(2)(C) of the National Environmental Policy Act (NEPA)[1] that all federal agencies prepare a detailed environmental impact statement (EIS) on all actions significantly affecting the quality of the human environment has fundamentally changed energy resource development policy. At first thought to be a rather insignificant regulation, the EIS requirement has instead served as a major access point for broadened public participation in and criticism of government actions. The EIS was designed to insure that balanced decisionmaking occurs in the "public interest" and that integrated consideration of technical, economic, environmental, and social factors is included in the technology/impact review. In addition, the EIS serves as a sort of "public disclosure law" for energy and environmental actions.[1]

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[1] National Environmental Policy Act of 1969, Pub. L. 91-190, 83 Stat. 852.

2.2.1 Federal Controls

2.2.1.1 Legal Framework

The NEPA was the landmark legislative achievement of the environmental movement of the 1960s. Enacted in 1969, NEPA was largely a response to the problem of policy fragmentation among federal organizations. Environmental policy before NEPA had been managed by agencies whose primary focus was agriculture, human health, or economic development, with little coordination or integration in terms of environmental quality. NEPA established a national policy which required all federal agencies to consider environmental impacts in planning and implementing their programs. Although no specific compliance provisions were written into the law, NEPA did mandate a number of "action-forcing" procedures, the most important of which has been the section 102 requirement that the responsible federal agency prepare an EIS and submit it to a review process before the action can be undertaken. Thus, three questions must be asked to determine whether an action requires an EIS: Is the action major? Is it federal? Will it have a significant environmental impact? In general, the courts have interpreted each of these criteria broadly, giving a wide applicability to NEPA's EIS requirements. As a result, NEPA covers actions ranging from federal funding of power plant, reservoir, or highway construction to federal contracts, grants, and loans to private individuals and groups (an exception to the latter is the relinquishment of federal responsibility for the preparation of an EIS for general revenue sharing).[1] Only in the areas of national security policy or emergency actions has the judiciary limited the applicability of NEPA provisions.[2]

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[1] Canter, L.W. Environmental Impact Assessment. New York, N.Y.: McGraw-Hill, 1977, Chapter 1; and Fairfax, Sally K. "A Disaster in the Environmental Movement." Science, Vol. 199 (February 17, 1978), pp. 743-48.

2.2.1.2 Administrative Authority

Title II of NEPA established the Council on Environmental Quality (CEQ) to advise the President on environmental affairs, provide the public with information on environmental matters, and monitor other agency compliance with NEPA.[3] In addition, CEQ was to be the repository for the EIS, the reviewer of draft EIS, and the developer of comparative analyses on the impact statement process. As overseer of NEPA controls, CEQ promulgates guidelines for EIS preparation, but these statements are advisory only. Under CEQ authority, the "lead" agency which has responsibility for a program prepares an EIS to include: a description of the proposed action; the relationship of the action to land-use policies, plans, and controls; the probable impacts (both positive and negative, both direct and indirect); and the adverse effects (both short- and long-term) of the action, major alternative courses of action, and the relation of the action to other federal policies. The EIS must also include a list of the states, localities, and agencies affected by the proposed action and a consideration of the problems and objections raised by reviewers.

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[1] Blissett, Marlan. "Environmental Assessment in Perspective," in Blissett, Marlan, ed. Environmental Impact Assessment. Austin, Tex.: Engineering Foundation, 1975, pp. 264-65.

[2] Anderson, Frederick R. NEPA in the Courts: A Legal Analysis of the National Environmental Policy Act. Baltimore, Md.: Johns Hopkins University Press, 1975, pp. 134-39.

[3] Liroff, Richard A. A National Policy for the Environment: NEPA and Its Aftermath. Bloomington, Ind.: Indiana University Press, 1976, pp. 36-45.

Each EIS is first prepared in draft form, routed through other federal, state, and local agencies with expertise or authority in the policy area, and exposed to public examination, consultation and review. The Office of Management and Budget (OMB) has established a number of state and local clearing houses to allow input from other levels of government. And interest groups participate through public hearings at the draft EIS stage. The final EIS lists these coordination efforts and seeks to respond to issues and questions raised during the drafting process.

The establishment of the Environmental Protection Agency (EPA) eleven months after NEPA's enactment added another significant factor to the EIS administrative process. Under the 1970 Clean Air Act (CAA),[1] EPA was authorized to police the environmental activities of other agencies by reviewing and publicly commenting on "environmentally impacting actions."[1]

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[1] Clean Air Act of 1970, Pub. L. 91-604, 84 Stat. 1676.

The EIS functions of the CEQ and EPA were not altered by the Department of Energy (DOE) reorganization in 1977. Rather than incorporating the dual responsibilities of energy production and environmental protection, as had been proposed in earlier unsuccessful energy reorganization efforts, the DOE will focus on the energy production mission.[2] Thus the CEQ and EPA can "remain independent to voice environmental concern."[3]

2.2.1.3 Regulatory Provisions

NEPA's regulatory framework differs from that of most federal legislation on two points. First, few laws are written in such general terms. And second, the statute does not arm the responsible agency (CEQ) with compliance and enforcement sanctions.[4] Generally, however, few exemptions to NEPA's EIS requirements have been granted by the courts. Although initially all "environmental" agencies were excluded from NEPA obligations, most organizations quickly acquiesced to the EIS standards. Eventually, even the nation's major line agency in the environmental protection field, EPA, has had its exemption in certain areas removed by CEQ.

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[1] Liroff, Richard A. A National Policy for the Environment: NEPA and Its Aftermath. Bloomington, Ind.: Indiana University Press, 1976, p. 110.

[2] Corrigan, Richard. "Congress Takes a Chip Off Carter's Energy Block." National Journal, Vol. 9 (June 11, 1977), p. 889.

[3] U.S., Office of the White House, Press Secretary. "Introduction of DOE Legislation." Press Release, March 1, 1977, p. 3.

[4] Curlin, James W. "The Role of the Courts in the Implementation of NEPA," in Blissett, Marlan, ed. Environmental Impact Assessment. Austin, Tex.: Engineering Foundation, 1975, p. 27. See also Bardach, Eugene, and Lucian Pugliaresi. "The Environmental Impact Statement and the Real World." The Public Interest, Vol. 49 (Fall 1977), pp. 22-38.

2.2.2 Indian Controls

If the development activity requires federal approval, the EIS requirements for the special jurisdiction of Indian lands are generally the same as for other federal jurisdictions. Where an action involves only the Indian tribe and a second party (and not federal approval), no impact statement is required.[1] Generally, where federal approval is mandated, the Bureau of Indian Affairs (BIA) is the lead agency, although other agencies may at times have such responsibilities.

2.2.3 State Controls[2]

Following the lead of the federal government, by 1977 twenty-two states (and two municipalities) had adopted their own requirements for detailed analyses of environmental impacts prior to development.[3] And these comprehensive, NEPA-like standards are only one form of existing "state environmental policy acts"

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[1] Will, J. Kemper. "Environmental Protection of Indian Lands and Application of NEPA," in Rocky Mountain Mineral Law Foundation, ed. Institute on Indian Land Development--Oil, Gas, Coal and Other Minerals. Tucson, Ariz.: Rocky Mountain Mineral Law Foundation, 1976, p. 8-20.

[2] This discussion is based on the best information available in mid-1977.

[3] Kirschten, J. Dicken. "Paperwork Is Having a Big Impact on Environmental Statements." National Journal, Vol. 9 (July 16, 1977), p. 1120.

(or SEPAs). Other states have promulgated statutes which require only after-the-fact legal responses to violations of environmental standards. Still other state environmental controls are only advisory, coordinating, or planning mechanisms. And some states still do not systematically regulate environmental impacts from energy developments.

In the western region, six of the eight states have a SEPA in one form or another; only Utah and New Mexico do not explicitly mandate environmental controls. Table 2-1 summarizes the existing western state approaches to insuring environmental quality. As the table indicates, Arizona, Montana, and South Dakota have comprehensive environmental quality laws modeled after NEPA. North Dakota and Wyoming have implemented after-the-fact "law enforcement" mechanisms for protecting the environment. And Colorado has a coordinating and planning arrangement which has only advisory power in environmental policy-making.

The most comprehensive environmental quality legislation in the western region has been promulgated by Montana. Enacted in 1971, the Montana SEPA requires an EIS to be prepared by the appropriate lead agency and submitted to the state Environmental Quality Council for every recommendation, report, or proposal leading to a project, program, legislation, or other major action of the state government which would significantly affect the quality of the human environment. Montana's legislation specified EIS components which closely parallel those outlined in NEPA: environmental impacts of development actions, adverse effects, alternatives, short- and long-term impacts, and resource commitments.

TABLE 2-1. STATUS OF THE STATE ENVIRONMENTAL PROTECTION CONTROLS, 1975

State	State Environmental Protection Acts		
	NEPA-Type (EIS)	Law Enforcement Type	Coordinating Type
Arizona	Yes, but EIS requirement limited to water projects (Game and Fish Commission)		
Colorado		No, rejected in 1975	Yes, established in 1963
Montana	Yes, enacted in 1971 (Environmental Quality Council)		
New Mexico		No, rejected in 1975	
North Dakota		Yes, enacted in 1975	
South Dakota	Yes, enacted in 1975		
Utah			
Wyoming		Yes, enacted in 1973 (Department of Environmental Quality)	

NEPA = National Energy Policy Act EIS = environmental impact statement

Sources: Personal communications with state officials.

Arizona's 1971 EIS requirement is applicable only to the acquisition of water conservation and development funds. Those funds are available for land purchase and water development projects. The Game and Fish Commission, which administers the Arizona EIS requirements, prescribes a discussion of the environmental impacts, adverse effects, alternatives, productivity (short- and long-term) and resource commitments for proposed developments.

The state of Colorado has required only a coordinating and planning function of its environmental quality agency since 1963. An attempt to pass a "law enforcement" SEPA (similar to those of North Dakota and Wyoming) failed in 1975. New Mexico has gone the opposite route. An EIS requirement was passed in New Mexico in 1971 and then repealed. A proposed SEPA with no EIS requirement was rejected in 1975.

Finally, Utah has no SEPA, nor has it attempted to produce one in recent years. Utah does have a constitutional article expressing environmental concern as a public policy, but this position is limited specifically to the protection of forests.

2.3 SITING AND LAND USE

As the U.S. has attempted simultaneously to increase energy supplies while diversifying supply sources, policymakers have been confronted by facility location and land-use problems. Even when the society agrees that energy supplies need to be increased, the possibility of undesirable local impacts makes it difficult to find a site which is acceptable to all parties-at-interest. As a result, new energy supply activities are often delayed.[1] And any proposed development is always under pressures exerted by competing land uses (agriculture, etc.). These pressures may also act to constrain energy production. Particularly in the West, the importance attached to the landscape has focused state and local decisionmaking on land use and facility siting controls.

2.3.1 Federal Controls

2.3.1.1 Legal Framework

The federal government has little direct control over either the location of energy facilities or the manner in which energy-related activities use land; most siting and land-use authority resides in state and local governments.[2] Reacting to the threat of state impediments to the future development and flow of crucial national energy resources, a Federal Land-Use Policy Act has been introduced in Congress on a number of occasions. Although the Federal Land Policy and Management Act,[3] which reaffirmed the policy of comprehensive land-use planning based on multiple resource management principles, was enacted in 1976, this legislation has nothing to do with the setting of objective criteria or the systematic evaluation of siting alternatives. Instead, the 1976 legislation is limited to the disposition of the public lands.

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[1] See Ramsay, William. "Siting Power Plants." Environmental Science and Technology, Vol. 11 (March 1977), pp. 238-43.

[2] Ford Foundation, Energy Policy Project. A Time to Choose: America's Energy Future. Cambridge, Mass.: Ballinger, 1974, p. 488.

[3] Federal Land Policy and Management Act of 1976, Pub. L. 94-579, 90 Stat. 2743.

It is in the control of publicly-owned lands and resources that the federal government does have direct authority over energy facility siting and land use. Under the terms of legislation dating back to the 1920 Mineral Leasing Act,[1] federal officials have assumed extensive discretionary authority over leasing arrangements and development impacts. A more detailed outline of these federal control mechanisms is contained in the discussions of resource exploration, acquisition, and extraction which follow later in this chapter.

Indirect federal control over land use and location is a much more pervasive factor than direct federal regulation. By changing air, water, and noise rules, for example, the federal government can have a significant impact upon the completion of any natual resource development project.[2] A listing of the indirect federal controls on siting and land use would include the permit procedures under the Clean Water Act,[3] the emissions limitations of the CAA,[4] and NEPA's requirement for EIS consideration of locational alternatives and impacts. An elaboration of these controls is located in the discussions of air and water quality and water use below.

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[1] Mineral Leasing Act of 1920, 41 Stat. 437.

[2] See White, Michael D. "Constitutional Derivation and Statutory Exercise of Land Use Control Power," in Rocky Mountain Mineral Law Foundation, ed. Rocky Mountain Mineral Law Institute. Proceedings of the 21st Annual Institute. New York, N.Y.: Matthew Bender, 1975, pp. 657-68.

[3] Clean Water Act of 1977, Pub. L. 95-217, 91 Stat. 1566.

[4] Clean Air Act Amendments of 1977, Pub. L. 95-95, 91 Stat. 685.

2.3.1.2 Administrative Authority

Three federal agencies have some authority over facility siting. The Federal Energy Regulatory Commission (FERC) within the DOE controls the siting of hydroelectric facilities on interstate waters and the regulation of pipeline construction. The Department of the Interior (DOI), particularly the Bureau of Land Management (BLM) and the U.S. Geological Survey (USGS), controls the construction of facilities on federal lands. And the Nuclear Regulatory Commission (NRC) is charged with regulating the licensing and siting of atomic energy facilities in the interests of public health, safety, and environmental protection. The issue of the location of nuclear power plants has been perhaps the most important land-use and siting issue of the 1970s.[1]

The DOE reorganization has not significantly altered this administrative framework. Although the creation of a cabinet-level energy department certainly provides a more effective mechanism for developing more comprehensive energy policies, the exclusion of most DOI functions from the new agency assures a continuation of past patterns of policy implementation in the siting and land-use area.

2.3.1.3 Regulatory Provisions

Since there is no comprehensive federal land-use legislation, there are few direct federal regulatory provisions which apply to nonfederally-owned lands. The proposed legislation has generally been designed to induce the states to adopt more comprehensive statewide planning and controls--through, for example, the mechanism of federal funding for states to develop coordinated land management capabilities. The specific federal regulatory provisions for control of land-use and facility location on federal lands are discussed in sections which follow.

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[1] See Muntzing, L. Manning. "Siting and Environment: Essentials in an Effective Nuclear Siting Policy." Energy Policy, Vol. 4 (March 1976), pp. 3-11.

2.3.2 Indian Controls

Indian land-use provisions vary among the approximately fifty reservations located in the eight-state western region. In general, legal title to Indian lands is held by the federal government as trustee for the Indians, who retain beneficiary rights of use, occupation, and limited management and disposition. Specific modes of Indian land acquisition, disposal, or use vary according to ownership. Both tribal and individually-owned lands are subject to a range of treaties, executive orders, and acts of Congress. Among the latter, the most significant is the Indian Reorganization Act of 1934,[1] which established general limitations on the disposal of tribal property and ended the allotting of individual Indian landholdings.

Congress has established that Indian lands are not included within statutes outlining mineral laws on the "public domain."[2] Nor do states have powers over Indian reservations other than those expressly given to them by Congress. Provisions do exist, however, for the Secretary of the Interior (or his subordinate, the Commissioner for Indian Affairs) in his trusteeship role, to exercise considerable discretionary authority in such matters as the granting of rights-of-way and the leasing of Indian lands. It should be noted that this discretionary authority is increasingly constrained by the growing pressure by the Indian tribes to control tribal affairs.

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[1] Indian Reorganization Act of 1934, Pub. L. 73-383, 48 Stat. 984.

[2] Lavell, William G., and William D. Back. "Indian Land Status," in Rocky Mountain Mineral Law Foundation, ed. *Institute on Indian Land Development--Oil, Gas, Coal and Other Minerals*. Tucson, Ariz.: Rocky Mountain Mineral Law Foundation, 1976, p. 5-2.

2.3.3 State Controls

States have extensive control of land-use and facility siting. Under the state "police power," governments can control energy resource development through zoning laws, building codes, subdivision regulations, permit requirements, and performance standards.[1] In many instances, however, this state authority has been delegated to local, county, or regional organization. In addition to these regulations designed to protect public health, welfare, and safety, states have direct control over the development of state-owned resources.

Typically, states have attempted to regulate such activities as surface mining or the development of floodplains, wetlands, or other "critical areas" through fragmented, incremental programs.[2] But in the 1970s, an increasing number of states have implemented statewide, comprehensive land-use legislation. These acts usually provide access points for public participation in state development decisions and establish basic planning criteria (efficient use, etc.) which must be met prior to undertaking actual development activities. Even more commonplace have been the more limited attempts to control the facility siting process through "certificates of public convenience and necessity" and other construction certification procedures.

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[1] University of Florida, Center for Governmental Responsibility. Energy: The Power of the States. Gainesville, Fla.: University of Florida, 1975, p. 161.

[2] Moss, Elaine, ed. Land Use Controls in the United States: A Handbook on the Legal Rights of Citizens. New York, N.Y.: Dial Press, 1977, pp. 252-58.

Of the western states, only two (Colorado and Wyoming) have enacted state land-use programs. Six states (Arizona, Colorado, Montana, New Mexico, North Dakota, and Wyoming) have statutory controls over facility siting.[1] Table 2-2 summarizes the state laws affecting land-use and facility siting in the West. The discussion which follows is an attempt to briefly describe the existing land-use and siting controls in each of the eight states.

The Wyoming Land-Use Commission is the state agency assigned the task of developing and enforcing land-use policy (and evaluating EIS studies). The Commission is involved in both planning and regulatory activities as well as undertaking technical assessments and compliance evaluations. Facility siting in Wyoming is governed by the Industrial Siting Council under the provisions of the Industrial Development Information and Siting Act.[2] This legislation regulates the siting of power plants generating more than 100 megawatts or costing more than $50 million. The control mechanism is a permit which is issued upon submission of a long-range plan and consideration of impact

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[1] Rapp, Donald A. Western Boomtowns: Part I, Amended: A Comparative Analysis of State Actions. Denver, Colo.: Western Governors' Regional Energy Policy Office, 1976, pp. 36-43.

[2] Industrial Development Information and Siting Act of 1975, Wyoming Statutes §§ 35-502.75 et seq. (Cumulated Supplement 1975).

TABLE 2-2. STATUS OF STATE LAND-USE CONTROLS, 1975

	ENABLING LEGISLATION					FUNCTIONAL PROGRAMS						
STATE	Municipalities	Counties	Regional Advisory Agency Only	Regional Agency Review Powers	Coordination of Functional Program	Land Use-Value Tax Assessment Law	Surface Mining	Floodplain Regulations	Power Plant Siting	Wetlands Management	Critical Areas	State Land-Use Program
Arizona	✓	✓	✓		✓			✓	✓			
Colorado	✓	✓		✓		✓	✓	✓	✓		✓	✓
Montana	✓	✓	✓			✓	✓	✓	✓			
New Mexico	✓	✓	✓		✓	✓	✓		✓			
North Dakota	✓	✓	✓			✓	✓		✓			
South Dakota	✓	✓	✓			✓	✓					
Utah	✓	✓	✓		✓	✓					✓	
Wyoming	✓	✓		✓	✓	✓	✓		✓			✓

Sources: Moss, Elaine, ed. Land-Use Controls in the United States: A Handbook on the Legal Rights of Citizens. New York, N.Y.: Dial Press, 1977, pp. 254-255.

factors (discharges, etc.) and locational conflicts with state, intrastate, regional, county, and local land-use plans.

Facility siting regulation in Montana is the most comprehensive of the western states. Under the provisions of the Major Facility Siting Act,[1] the state Board of Natural Resources and Conservation issues certificates of site compatibility. This control mechanism applies to a variety of facilities, including power plants over 50 megawatts, uranium enrichment, gas processing, oil refining and pipeline facilities, and transmission lines. The certificate is issued upon submission of a ten-year plan and consideration of a range of environmental impact criteria. In comparing the siting controls of Montana and Wyoming, Donald Rapp has noted:

> The states of Montana and Wyoming have provided an excellent example for western states to examine. Both laws provide an extensive list of factors to be considered by the reviewing agency of state government. In the case of Montana, the burden of proof is clearly placed upon the applicant to prove his application will not provide a net negative effect upon the state.
>
> Wyoming clearly has the authority to deny the permit, based on socioeconomic consideration. The authority permits conditioning the timing of construction to allow for local governments to develop the capacity to accommodate rapid population growth associated with the facility in advance of the beginning of construction. Thus, in Wyoming, the plant siting authority clearly represents the single most important tool to assure state sovereignty over securing solutions to community development impact problems.[2]

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[1] Major Facility Siting Act, § 70-801 Revised Code of Montana (1975).

[2] Rapp, Donald A. Western Boomtowns: Part I, Amended: A Comparative Analysis of State Actions. Denver, Colo.: Western Governors' Regional Energy Policy Office, 1976, p. 43.

Arizona's Siting Committee has siting authority for power plants over 100 megawatts through the control mechanism of a certificate of environmental compatibility. This mechanism, issued on consideration of a ten-year plan, evaluates environmental factors, historic and scenic impacts, and costs (among other elements) as criteria for siting decisions.[1]

Colorado is one of only two states in the West (the other is Wyoming) which has a state agency primarily designed to enforce land-use planning regulations and to evaluate EIS assessment studies. The Colorado Land-Use Commission, which fills this role, has developed a comprehensive set of model regulations for county and municipal governments. These include siting requirements and restrictions in areas such as electric transmission line location, or other activities which may be designated as matters of state interest. In addition, the Colorado Public Utilities Commission has extensive energy facility siting authority through its power to grant or deny certificates of convenience and public neccesity.[2]

In North Dakota, the state Public Service Commission regulates the siting of any energy conversion facility through the issuance of a certificate of site compatibility. These permits are issued upon the submission of a ten-year plan, a letter of intent prior to construction, a certificate of public convenience and necessity (where applicable), and a public hearing. In addition, the Public Service Commission controls the siting of transmission facilities through a certificate of transmission facility corridor site compatibility.[1]

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[1] See Westerby, David A. "Power Plant and Transmission Line Siting: Improving Arizona's Legislative Approach." Law and the Social Order, Vol. 1973 (No. 2, 1973), pp. 519-41.

[2] Hobbs, Gregory J., Jr., First Assistant Attorney General, Natural Resources Section, State of Colorado. Personal communication, July 13, 1977, p. 1.

Most of the western states' facility siting regulations originated in early attempts to control monopolies. These statutes created public service commissions which issued certificates of public convenience and necessity. New Mexico simply promulgated additional requirements for these certificates to make them more effective utility siting controls. Thus, the New Mexico Public Service Commission regulates the siting of power plants over 300 megawatts by applying convenience criteria. Also, the New Mexico Energy Resources Board, established as an advisory committee to other state agencies, has an impact on land use through its authority over the conservation of power-producing fuels.

The states of Utah and South Dakota have no state agencies with direct authority over land-use or facility siting actions.

2.4 RESOURCE EXPLORATION

Energy resource development includes a sequence of activities beginning with resource exploration, proceeding through resource acquisition, extraction, conversion, distribution, and use. In the following section, federal, state, and Indian controls on the first phase of this sequence--resource exploration--will be described.

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[1] Tiistola, David W., Assistant Commerce Counsel, North Dakota Public Service Commission. Personal communication, July 13, 1977, pp. 2-3.

2.4.1 Federal Controls

2.4.1.1 Legal Framework

The federal government controls the exploration for energy resources through a broad legal framework. Underlying the system of federal exploration rules and regulations is the General Mining Law of 1872,[1] which established a "claims" or "location" system for encouraging mineral exploration and development. Under this statute, the process of gaining ownership and control of public resources was based on discovery (location), appropriation, and development. By 1920, pressures had begun to build for the establishment of limits on the rapid sale of federal resources. The result was the Minerals Leasing Act,[2] which implemented a "leasing" system for public lands. The 1920 act established procedures for acquiring the necessary permits for public domain resource development while reserving title to the land to the federal government. This provision represented a compromise between the claims procedures of the 1872 law and the demands for a more restrictive policy.

Since 1920, the federal legal framework which controls resource exploration has been modified significantly by a number of amendments and new statutes. In 1947, the Acquired Lands Leasing Act[3] authorized the leasing of energy resources on those lands which had been acquired by the federal government. The

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[1] General Mining Law of 1872, 17 Stat. 91.

[2] Mineral Leasing Act of 1920, Pub. L. 66-146, 41 Stat. 437.

[3] Acquired Lands Leasing Act, Pub. L. 80-382, 61 Stat. 913.

Multiple Minerals Development Act passed in 1954,[1] attempted to remedy conflicts between existing leasing and location rules and regulations. This act introduced standards which encouraged simultaneous development of multiple resources with the goal of minimal hindrance to any one resource's exploration, acquisition, or extraction. The national policy guidelines and standards by which the federal government would encourage such goals as the "orderly and economic development of domestic mineral resources" were set out in the 1970 Mining and Mineral Policy Act.[2] That same year the Geothermal Steam Act[3] provided for the orderly and environmentally prudent development of geothermal resources. Finally, in 1976 the Coal Leasing Amendments Act[4] was passed, establishing a totally competitive coal leasing system and redefining a number of coal development criteria more stringently.[5]

Table 2-3 outlines the applicability of various types of federal exploration controls by energy resource. As this table illustrates, the 1872 General Mining Law (also termed the Mineral Location Act) is applicable only to uranium exploration and development. But the 1920 Mineral Leasing Act and the 1947 Acquired Lands Leasing Act apply to oil, natural gas, oil shale,

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[1] Multiple Minerals Development Act, Pub. L. 91-581, 84 Stat. 1573.

[2] Mining and Mineral Policy Act, Pub. L. 91-583, 84 Stat. 1876.

[3] Geothermal Steam Act, Pub. L. 91-581, 84 Stat. 1566.

[4] Federal Coal Leasing Amendments Act of 1975, Pub. L. 94-377, 90 Stat. 1083.

[5] Kleppe, Thomas S., Secretary of the Interior, and Russell E. Train, Administrator, U.S. Environmental Protection Agency. Personal intercommunication re "New Federal Coal Leasing Policy to Be Implemented Under Controlled Conditions," January 23, 1976.

TABLE 2-3. FEDERAL EXPLORATION CONTROLS

	LEGAL FRAMEWORK FOR RESOURCE EXPLORATION				
	General Mining Law of 1872 (Claim-Patent)	Mineral Leasing Act of 1920 (Permit-Lease)	Acquired Lands Leasing Act of 1947 (Permit-Lease)	Geothermal Steam Act of 1970 (Permit-Lease)	Coal Leasing Amendments Act of 1976 (Lease)
RESOURCE					
Coal		✓	✓		✓
Oil		✓	✓		
Natural Gas		✓	✓		
Oil Shale		✓	✓		
Geothermal				✓	
Uranium	✓				

Sources: U.S., Congress, Senate, Committee on Interior and Insular Affairs. Federal Leasing and Disposal Policies, Hearings pursuant to S. Res. 45, A National Fuels and Energy Policy Study, 92d Cong., 2d. sess., June 19, 1972, pp. 279-285; and University of Oklahoma, Science and Public Policy Program, Fossil Fuel Research Team. The Coal and Oil Shale Resource Development Systems: An Interim Report. Norman, Okla.: University of Oklahoma, Science and Public Policy Program, 1974, pp. 181-185.

and coal (as modified by the 1976 Coal Leasing Amendments Act). And the 1970 Geothermal Steam Act applies only to geothermal energy.

2.4.1.2 Administrative Authority

The federal rules and regulations for energy resource exploration are administered for the most part by the DOI. Two components of DOI are especially significant in the administration of federal resource exploration controls--the BLM and the USGS. In the case of Indian lands, the BIA also has responsibility for resource exploration. In addition to these DOI bureaus, the Department of Agriculture (USDA), and specifically its Forest Service, and the Department of Defense (DOD), particularly the Corps of Engineers (COE), have primary administrative authority over resource exploration activities on federal lands.

Regardless of which agency is charged with the responsibility for making energy resources available for development, there are four categories of administrative arrangements within which resource exploration can be undertaken: public domain (lands subject to disposal under the general U.S. land laws); reserved (lands set apart for special use); withdrawn (lands temporarily removed from public domain, usually for conservation purposes); and acquired (lands which were never a part of the public domain until acquired by the federal government).[1] In developing these publicly-owned resources, the goals of DOI have included assuring "orderly and timely development," including promoting exploration, encouraging development compatible with other land uses, and maximum ultimate recovery, protecting the environment and public safety, and insuring the public a "fair market value" return.

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[1] University of Oklahoma, Science and Public Policy Program, Fossil Fuel Research Team. The Coal and Oil Shale Resource Development Systems: An Interim Report. Norman, Okla.: University of Oklahoma, Science and Public Policy Program, 1974, p. 185.

2.4.1.3 Regulatory Provisions

Traditionally, DOI has had four regulatory options to achieve its goals and objectives for public resource exploration: the mining claim, the preference lease, the noncompetitive lease, and the competitive lease. The first three of these are applicable to situations where little is known about the characteristics of the resource and some exploratory activity is required. When resource characteristics are well known or can be reasonably estimated, the fourth alternative--the competitive lease--is available.

In recent years these regulatory provisions have been the target of repeated reform efforts. The 1976 Coal Leasing Amendments Act[1] was only the first response to the problems of the 1872 and 1920 legislation (nonproductive leases and claims, insufficient compensation to the federal government, environmental damage, etc.). The 1976 act requires that all coal leases be sold only by competitive bidding. Suggested revisions in the 1872 law would discontinue the claims procedure by installing a system of prospecting permits, exploration permits, and preference leases. But these proposals are still before the Congress.

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[1] Federal Coal Leasing Amendments Act of 1975, Pub. L. 94-377, 90 Stat. 1083.

There are two types of mining claims--lode and placer. Lode claims consist of a continuous body of mineralized rock, while placer claims consist of minerals occurring as loose grains in sand and gravel. Uranium exploration is controlled by claims procedures, under which an individual or group may enter public domain lands and, upon discovery of the mineral, make and hold a claim by performing a minimum amount of labor on the claim per year. Different resource exploration procedures apply to uranium exploration on withdrawn, acquired and reserved lands, but these land categories are not currently identified by the federal government as uranium-containing areas.[1]

The preference lease option, applicable to all resources except coal and uranium, is based on the applicant acquiring a prospecting permit which grants the authority to explore the land. If the exploratory activities demonstrate the presence of "workable deposits," the applicant may then be awarded preferential rights to develop the resources.

A noncompetitive lease is an agreement between the federal government and an applicant in which the terms for resource exploration and development are not established by law, but are negotiated according to the particular circumstances of the situation.

Since the competitive leasing option requires no resource exploration, its provisions are discussed in the sections dealing with resource acquisition below.

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[1] U.S., Congress, Senate, Committee on Interior and Insular Affairs. Federal Leasing and Disposal Policies. Hearings pursuant to S. Res. 45, A National Fuels and Energy Policy Study, 92d Cong., 2d sess., June 19, 1972, pp. 282-83.

Both preference and noncompetitive leasing procedures are usually administered by the BLM and USGS, which are responsible for recording applications, collecting fees, rents and royalties, evaluating environmental impacts, and coordinating exploratory activities with other federal agencies. Although the terms of leases vary significantly according to resource characteristics, generally the prospecting permit (for preference leasing) requires the submission of an exploration plan, an estimate of costs, and a timetable of diligent development. Following approval of the plan and a preliminary environmental assessment, there is broad discretionary authority vested in the Secretary of the Interior and his subordinates to establish the terms under which exploration will take place. And the terms of exploration established by the Secretary are subject to discretionary adjustments. Moreover, thec reation of a DOE left undisturbed most of this DOI control.

2.4.2 Indian Controls

Resource exploration controls on Indian lands are basically the same as those for federal lands, except that special legislation has been required because Indians share legal title with the federal government. General authority to lease allotted Indian lands was established by the Indian Appropriations Act of 1909,[1] while tribal land leasing was authorized by the 1938 Omnibus Tribal Leasing Act.[2] In the case of both tribal and allotted lands, the BIA acts as trustee. And all Indian leases require approval from the Secretary of the Interior and the tribe or individual--both the federal government and the Indians retain veto power over a lease.

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[1] Indian Department Appropriations Act of 1909, Pub. L. 60-316, 35 Stat. 78.

[2] Omnibus Tribal Leasing Act of 1938, Pub. L. 75-506, 52 Stat. 347.

2.4.3 State Controls

Although state governments have some measure of control over energy resource exploration activities on federally-owned lands (through the use of their police power to tax land improvements, etc.), most state controls are exercised on private or state-owned lands. Almost all state governments have policies designed to "promote the discovery and development of the mineral resources of the state for the benefit of the public through a system of licensing on a royalty basis."[1] Even in the area of state regulation of state-owned lands, however, state controls are not absolute. This is because:

> Under the supremacy doctrine, state property must be used in a manner not inconsistent with existing federal law. For example, the grant of submerged lands to the states by the federal government contained a reservation of authority for the federal government to use the lands and waters for navigation and power production. The supremacy of federal law would prevent any state action which would jeopardize this interest.
>
> If the exploration for energy resources becomes more crucial, the federal government could conceivably assume more control. This type of action has already occurred in the distribution phase through the Emergency Petroleum Allocation Act. The federal government may at any time institute condemnation proceedings to take desired lands for exploration and leasing purposes. Such a taking would necessarily require compensation and would have to be for public purpose.

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[1] Verity, Victor, John Lacy, and Joseph Geraud. "Mineral Laws of State and Local Government Bodies," in Rocky Mountain Mineral Law Foundation, ed. The American Law of Mining. New York, N.Y.: Matthew Bender, Vol. 2, p. 627 (1974).

> Alternatively, if the shortage of energy resources were construed as a national security matter, the war power could be used to pre-empt any state regulation in the area of exploration.[1]

In most states, authority for managing and leasing state resources is located in a single agency (as is the case in Colorado). However, some states allow each state agency which controls state lands to lease resources (North Dakota utilizes this approach). A wide range of administrative discretion is also vested in the various state leasing agencies. And some states retain mining claims (location procedures) as the first step in the leasing process, while other states use competitive or preference leasing arrangements (as in Arizona and New Mexico).

The terms of most state exploration permits range from ninety days to two years, and they are usually renewable. Most states' prospecting permits require exploration plans, place limits on extraction prior to leasing, restrict exploration on lands already known to contain commercially valuable minerals, and require some form of bond to be posted. States may also cancel permits for noncompliance. More specific details on state resource exploration controls are contained in the individual Energy Resource Development Systems (ERDS) descriptions.

2.5 RESOURCE ACQUISITION

Following exploration, or when deposits are known to exist, there are a number of federal and state control mechanisms for regulating the acquisition of energy resources so that development can begin. Most resource acquisition controls follow the same general jurisdictional divisions (federal-Indian-state responsibilities) described in the section on resource exploration above. But there are additional laws, administrative agencies, and regulatory provisions which become operative for the resource acquisition sequence of energy development for both the federal and state levels of government and the special jurisdiciton of Indian lands.

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[1] University of Florida, Center for Governmental Responsibility. Energy: The Power of the States. Gainesville, Fla.: University of Florida, 1975, p. 88.

2.5.1 Federal Controls

2.5.1.1 Legal Framework

The first federal laws controlling resource acquisition were passed in the 1780s. But until the passage of the 1872 General Mining Law,[1] these early statutes did little but encourage the development of public lands as a source of government revenue and a means to encourage settlement of the frontier. The most important federal resource acquisition laws are summarized below in Table 2-4.

The passage of the 1872 law, as discussed above in the resource exploration section, marked a compromise between "free and open" resource acquisition and a more restrictive development policy. In 1910, the Pickett Act[2] gave the President discretionary authority to withdraw public lands from sale and reserved public lands for public use. The 1920 Minerals Leasing Act[3] returned to the policy of developing public lands while

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[1] General Mining Law of 1872, 17 Stat. 91.

[2] Pickett Act, Pub. L. 61-303, 36 Stat. 847.

[3] Mineral Leasing Act of 1920, Pub. L. 66-146, 41 Stat. 437.

TABLE 2-4. SUMMARY OF THE FEDERAL RESOURCE ACQUISITION LEGAL FRAMEWORK

Year	Act	Significant Aspects
1785	Land Ordinance	Lands viewed as a source of government revenue
1841	General Preemption Act	Encouraged land development
1862	Homestead Law	Encouraged land development
1866	The Mining Act	Public lands declared free and open, revenue raising abandoned
1872	General Mining Law	System for claims and encouragement of mineral exploration and development
1873	Coal Lands Act	Lands containing coal could be sold to private owners
1910	Pickett Act	Gave President discretionary authority to withdraw public lands from sale; reserved public lands for public use
1920	Minerals Leasing Act	Returned to early policy of developing public lands, but federal government retained title
1947	Acquired Lands Leasing Act	Extended leasing system to federal lands acquired for special purposes
1954	Multiple Minerals Development Act	Enabled mining for other minerals while reserving leasing rights for coal
1955	Multiple Surface Use Act	Encouraged multiple mineral development, especially sand and gravel on public lands subject to mining
1970	Mining and Minerals Policy Act	Established guidelines for a sound domestic minerals industry, orderly development, and research and development
1976	Coal Leasing Amendments Act	Required competitive leasing of all federal coal lands

retaining title for the government. And the 1947 Acquired Lands Leasing Act,[1] the 1954 Multiple Minerals Development Act,[2] the 1970 Mining and Minerals Policy Act[3] and the 1976 Coal Leasing Amendments Act[4] modified the 1920 legislation (see Table 2-4).

2.5.1.2 Administrative Authority

Historically, the DOI has had primary control over the leasing of energy resources. As the Center for Governmental Responsibility has observed:

> The Secretary of the Interior, through the Bureau of Land Management, has primary control over the exploration for, and leasing of, coal, oil, gas, and uranium deposits. The various federal agencies with jurisdiction over the surface of acquired lands may prevent the issuance of a lease, but only the Secretary has the authority to issue a lease. The Secretary has sole discretionary authority in the decision to issue leases for public domain lands and outer continental shelf lands.[5]

However, the DOE reorganization has significantly altered this system of federal leasing controls. Not only has the DOE itself assumed a primary policymaking role in federal energy resource acquisition decisions, but the 1977 reorganization created a new Leasing Liaison Committee (LLC) designed to enable joint DOE-DOI oversight of leasing regulation.

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[1] Acquired Lands Leasing Act, Pub. L. 80-382, 61 Stat. 913.

[2] Multiple Minerals Development Act, Pub. L. 91-581, 84 Stat. 1573

[3] Mining and Minerals Policy Act, Pub. L. 91-583, 84 Stat. 1876.

[4] Federal Coal Leasing Amendments Act of 1975, Pub. L. 94-377, 90 Stat. 1083.

[5] University of Florida, Center for Governmental Responsibility. Energy: The Power of the States. Gainesville, Fla.: University of Florida, 1975, p. 87.

The DOE reorganization leaves the DOI with broad responsibility for "executing the leasing program, including site selection, issuance and supervision of leases, and enforcement of terms and conditions."[1] These functions were left with DOI because the Carter Administration felt that the responsibility for multiple-use of public lands should be located in one department which could reflect a "broad spectrum of concern."[2] But the 1977 Department of Energy Organization Act[3] gives the new DOI control over the specification of economic leasing terms and conditions. Under the 1977 legislation, the Secretary of Energy will regulate four aspects of leasing. First, the DOE will establish long-term production goals for federally-owned resources to serve as planning guidelines for the DOI. These goals will be promulgated in conjunction with the Secretary of the Interior, and any dispute will be decided by the President. Second, the DOE will be responsible for the development of general economic terms and conditions of leasing. Such standards as rates of production, diligence requirements, and the disposition of federal royalties will be established by the new department. Third, the economic terms and conditions of individual leases (the eligibility of joint ventures, the actual bidding system, etc.) will be outlined by the DOE prior to the DOI's issuance of a lease. And fourth, economic terms and conditions for continuation of a lease may be delineated by the DOE, subject to DOI approval. For example, the DOE may recommend forfeiture of a lease which does not meet production rates. But the DOI will retain the final cancellation authority.

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[1] Bachman, W.A. "New Energy Department Shaping Up in Congress." Oil and Gas Journal, Vol. 75 (June 13, 1977), p. 21.

[2] "Energy Reorganization." Energy Today, Vol. 4 (March 1, 1977), p. 90.

[3] Deparment of Energy Organization Act, Pub. L. 95-91, 91 Stat. 565.

In order to further leasing policy coordination between the DOE and DOI, the Department of Energy Organization Act[1] created the LLC. Although structurally and functionally a part of the DOE (the LLC Chairman is designated by the Secretary of Energy), the LLC will be composed of an equal number of members from the two departments. The LLC will be responsible for keeping the Energy Secretary informed about leasing issues. And the LLC will serve as the vehicle for DOE-DOI communications on matters related to leasing.[2]

2.5.1.3 Regulatory Provisions

Many of the federal regulatory provisions for resource acquisition vary according to the resource. These provisions are discussed in the resource specific chapters, (3 through 8). However, there are also a number of procedures common to all the resources considered in this study. The common link to the acquisition of federal resources is the lease under the 1920

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[1] Department of Energy Organization Act, Pub. L. 95-91, 91 Stat. 565.

[2] U.S., Congress, Senate, Committee on Governmental Affairs. Department of Energy Organization Act. Hearing on S. 826, S. 591, 95th Cong., 1st sess., March 7-April 8, 1977.

Minerals Leasing Act,[1] the 1947 Acquired Lands Leasing Act[2] and the 1954 Multiple Minerals Development Act[3] (as modified for coal by the 1976 Coal Leasing Amendments[4]). Leases may be initiated by either the DOI or a private applicant. In general, federal mineral leases must be filed in the appropriate BLM land office, where the application is recorded as to location, land status, and the availability of rights. A copy of the application is then forwarded to the USGS and other agencies, if necessary. If other agencies with responsibility over the land object to the lease, it will not be granted. Applications for federal leases must be accompanied by a filing fee, and usually the first year's rental must also be paid at this time. Generally, the lessee must furnish a bond in compliance with the terms of the lease.[5] Federal leases are usually specific as to the size limitations, time periods, and renewal criteria for energy resource development.

Again, it is important to note that the 1976 Coal Leasing Amendments[6] represent an attempt to remove some of the uncertainty from the federal leasing system by assuring adequate planning prior to the leasing stage (through a planning system termed the Energy Minerals Allocation Recommendation System [EMARS][1]) and by encouraging diligent development of leases through the application of regulations and incentives which discourage the retention of nonproducing coal leases. For example, under the terms of the 1976 legislation, the speculative holding of leases was made more difficult by a provision that any lease which has not produced "commercial quantities" within fifteen years will be terminated. And the 1976 act requires that all coal leasing be done through competitive procedures. Also, the leasing amendments require more comprehensive land-use planning by DOI and other agencies prior to leasing.

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[1] Mineral Leasing Act of 1920, 41 Stat. 437.

[2] Acquired Lands Leasing Act. Pub. L. 80-382, 61 Stat. 913.

[3] Multiple Minerals Development Act, Pub. L. 91-583, 84 Stat. 1876.

[4] Federal Coal Leasing Amendments Act of 1975, Pub. L. 94-377, 90 Stat. 1083.

[5] Combo, John X. "Federal Mineral Leases," in Rocky Mountain Mineral Law Foundation, ed. The American Law of Mining. New York, N.Y.: Matthew Bender, Vol. 2, pp. 391-551 (1974).

[6] Coal Leasing Amendments Act.

Following a four-year leasing moratorium while the new federal controls were developed, the DOI attempted to resume coal acquisition procedures in 1976. However, the new DOI program was challenged in court (by the Natural Resources Defense Council [NRDC], in NRDC vs. Hughes, 1977[2]), and the government must prepare a new programmatic EIS before new leases may be promulgated. Thus, the DOI is still operating under a leasing moratorium under which coal may be leased only by short-term criteria (maintaining an existing operation or as a resource for future production) until this issue is resolved.[3]

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[1] EMARS is described in U.S., Department of the Interior, Bureau of Land Management. Draft Environmental Impact Statement: Proposed Federal Coal Leasing Program. Washington, D.C.: Government Printing Office, 1974, pp. I-1 through I-5.

[2] NRDC v. Hughes, 10 ERC 1713 (U.S. Dist. Court, D.C., September 27, 1977).

[3] "Kleppe Lifts Coal Leasing Moratorium." National Journal, Vol. 8 (January 31, 1976), p. 156; and "Interior Will Appeal Court Ruling in NRDC v Hughes." The Energy Daily, Vol. 5 (October 3, 1977), p.1.

2.5.2 Indian Controls

Procedures for acquiring Indian resources are substantially the same as those for federal leases, but there are distinctions which must be made between tribal and allotted (individual) lands. Under the terms of the Indian Appropriation Act,[1] lands allotted to the individual Indian by the U.S. may be leased for mineral development, pending approval of the Secretary of Interior. Lands allotted to individuals by tribal councils are subject to the terms of the tribal constitution in addition to the required DOI approval. Tribal lands leasing, governed by the Omnibus Tribal Leasing Act,[2] is usually controlled by tribal constitutions, charters, or bylaws, subject to the Secretary of the Interior's review.[3]

Unless the BIA's Commissioner of Indian Affairs rules otherwise, current regulations require competitive bidding for Indian mineral leases. Lease bids must be advertised, unless the Commissioner allows private negotiation. Lease size is limited to 2,560 acres, unless the Commissioner finds that a larger area is in the interest of the tribe and is required for large energy-related facilities. Rents and royalties are also established by regulation.

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[1] Indian Department Appropriations Act of 1909, 35 Stat. 783.

[2] Omnibus Tribal Leasing Act of 1938, Pub. L. 75-506, 52 Stat. 347.

[3] Adams, Mark K. "Conventional Leasing of Indian Land for Mineral Development," in Rocky Mountain Mineral Law Foundation, ed. Institute on Indian Land Development--Oil, Gas, Coal and Other Minerals. Tucson, Ariz.: Rocky Mountain Mineral Law Foundation, 1976, pp. 6-1 through 6-7.

Indian leasing procedures require diligent development. In the case of oil and gas leases, the regulations state that the lessees must exercise diligence in drilling and operating wells; for other minerals a minimum annual development expenditure is usually required.[1]

Efforts to change and reform the regulatory provisions for Indian leases are currently underway. The major alterations under consideration include: eliminating the current emphasis on leasing and adding provisions which will allow other alternatives, such as joint ventures; assigning the tribes the initiative for resource development; eliminating the requirement for Secretarial approval prior to lease negotiations; and requiring economic, environmental and sociocultural impact statements prior to lease arrangements.

2.5.3 State Controls

Most states have constitutional provisions authorizing the sale of state-owned lands. However, there has been a trend toward reserving mineral rights to the states. By 1970, most of the western states had enacted legislation providing for the leasing of state-owned lands, including: public lands that were still under the state's sovereign power at the time of admission to the Union; land grants to the state from the federal government at the time the state was created; lands in the beds of rivers and streams that were navigable at the time the state was created; and lands acquired by the state, such as lands confiscated for nonpayment of taxes.

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[1] See U.S., Federal Trade Commission, Bureau of Competition. Report to the Federal Trade Commission on Mineral Leasing on Indian Lands. Washington, D.C.: Federal Trade Commission, 1975.

Mineral lease applications at the state level usually require payment of fees to cover issuance and processing costs. Leasing may either take place on a first-come, first-serve basis, or may require competitive bidding. Many states require bonding for faithful performance of the lease. Usually, the state authority has discretionary authority to reject a lease application.

State leases for hard minerals are usually for a primary term of up to twenty years (although the length of these terms has been decreasing in recent years), with a preferential right of renewal for successive terms ranging in duration. Almost all states make a distinction between oil and gas leases and leases for all other minerals. Reasonable commercial production is often required of the lease (the most commonly used term is "diligent development," but "reasonable diligence" and "faithful operation" are also applied and have a similar meaning). Minerals may be leased by rental, royalty or a combination of the two methods. Rent is usually fixed, depending upon the number of acres, while royalty is usually a percentage of the production. Most states have provisions for the multiple use of state lands for mineral development and surface uses. Because state leasing procedures vary widely with the particular energy resource, more detailed descriptions of these social controls are reserved for the succeeding resource specific chapters of the ERDS Report (Chapters 3 and 8).

2.6 RESOURCE EXTRACTION

Following the preparation of an EIS, obtaining an exploration permit, and acquiring minerals through the leasing (or location) process, approval for the extraction of minerals must be obtained and regulations concerning extraction must be followed. This section outlines those social controls applicable to the extraction phase of energy resource development.

2.6.1 Federal Controls

2.6.1.1 Legal Framework

Resource extraction statutes at the federal level range from environmental protection standards (under NEPA[1]) through land-use and facility siting rules and regulations, to air, water, and noise quality legislation. In addition, reclamation, health and safety, and transportation laws are aspects of the federal legal framework which affect resource extraction. Since each of these substantive areas is discussed in detail in separate sections of this chapter, the focus here is upon those requirements directly applicable to resource recovery and conservation. Specifically, this discussion centers on the general operational procedures pertaining to drilling and mining plans and permits, and resource conservation and reclamation standards.

The federal legal framework governing mining and drilling plans is contained in the resource acquisition and exploration legislation which was discussed in the two previous sections of this chapter. Generally, mining and drilling plans must be submitted following the issuance of a lease. Likewise, resource conservation and reclamation criteria are built into the leasing framework, largely as a result of the legislation governing environmental impacts or land use.

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[1] National Environmental Policy Act of 1969, Pub. L. 91-190, 83 Stat. 852.

2.6.1.2 Administrative Authority

The DOI has the primary administrative authority for federal resource extraction activities. Mining and drilling plans are submitted to the Secretary of the Interior following the acquisition of a lease. The Secretary has discretionary authority to approve, modify, or deny such plans. Operational resource conservation regulations, usually included as a part of the drilling plan, are administered by the USGS, which has the responsibility for preventing waste in the development of federal resources. The Conservation Division of the USGS has specific regulatory authority for the promotion of good conservation practices through the operational regulations that it issues. The BLM has primary authority for resource reclamation requirements (also usually included in the operational mining or drilling plan).

The pressures for the federal government to enact more comprehensive strip mine reclamation controls have led to the one major modification in federal energy resource extraction controls in recent years. After more than a decade of debate, the Congress passed the 1977 Surface Mining Control and Reclamation Act,[1] which strengthened DOI enforcement capabilities, established joint federal-state enforcement authority, created an Abandoned Mine Reclamation Fund to repair past damages, and provided for exemptions for small operators.

A major provision of the 1977 act was the creation of the Office of Surface Mining Reclamation and Enforcement (OSMRE) in the DOI. The OSMRE is designed to function as the federal enforcement mechanism to insure compliance with environmental performance standards for all surface mining and for surface disturbances associated with underground mining.[1]

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[1] Surface Mining Control and Reclamation Act of 1977, Pub. L. 95-87, 91 Stat. 445. See also "Congress Passes Strip Mining Bill After Five Year Effort." National Journal, Vol. 9 (July 30, 1977), p. 1204.

New requirements for the development of federal minerals generally require standards such as diligent development of leased resources. With coal mining, for example, these standards mandate the submission of a mining plan, containing diligent development and continuous operation criteria, to the Secretary of the Interior within three years of the issuance of a lease. Following a review of the plan by the Secretary, other agencies with surface management responsibility conduct an environmental and technical analysis. Acting as a team, representatives of these agencies determine whether a plan should be approved. The Secretary of Interior has discretionary authority over the approval of the plan, but the agency with surface management responsibility may file its objections to a lease being issued.[2]

2.6.1.3 Regulatory Provisions

The extraction of federal resources is regulated by particular stipulations in the lease itself and by the appropriate federal regulations. These regulations are extensive, covering almost all aspects of mining and drilling operations. Generally, an approved mining or drilling plan includes the following information: descriptions and schedules of the operation and descriptions of the affected surrounding area; measures to protect and restore the environment, safety measures, methods of abandonment, and procedures to insure conservation of resources. In addition, the USGS Area Supervisor has the responsibility of determining what site-specific conditions merit incorporating into the leasing framework's safeguards. The USGS is also responsible for the periodic review of extraction procedures to insure compliance. Current federal extraction procedures provide for public hearings and review of possible adverse impacts of ongoing operations. In addition, developers must post performance bonds to insure that their operations are consistent with the requirements of development plans. Noncompliance with operational standards may result in the suspension of extraction activities. For more detailed information on these standards for separate resources, see the ERDS descriptions in Chapters 3 through 8.

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[1] Although the title of the 1977 act does not indicate it, the legislation covers, to a lesser extent, the surface impacts of underground coal mining operations. But federal regulations addressing these impacts have not yet been promulgated.

[2] U.S., Congress, Senate, Committee on Interior and Insular Affairs. Federal Leasing and Disposal Policies. Hearings pursuant to S. Res. 45, A National Fuels and Energy Policy Study, 92d Cong., 2d sess., June 19, 1972, p. 117.

2.6.2 Indian Controls

Federal controls applicable to extraction operations on Indian lands are similar to those outlined above. Measures designed to avoid, minimize, or correct damage to the environment and remove hazards to public health and safety are implemented by the BIA. In the evaluation of extraction efforts on Indian lands, BIA takes into account a number of factors, including:

> the need for the preservation and protection of other resources, including cultural, recreational, scenic, historic, and ecological values; and control of erosion, flooding, and pollution of water; the isolation of toxic materials; the prevention of air pollution; the reclamation by revegetation, replacement of soil, or by other means, of lands affected by the exploration

> or mining operations; the prevention of slides; and the protection of fish and wildlife and their habitat.[1]

Based on the results of such examinations, the BIA establishes the general requirements which the lessee must meet. The resulting mining plan must be approved by the USGS before operations can begin.

2.6.3 State Controls

State governments have generally established requirements for cooperative production and waste prevention for resource development on state-owned and private lands. In the case of oil and gas resource extraction, for example, states have established controls ranging from pooling arrangements to prorationing and maximum efficient recovery rates. More direct methods of controlling extraction processes include registration and licensing standards, safety regulations, and environmental protection rules.[2] In addition, there are now state-federal arrangements for the enforcement of reclamation regulations.[3]

In the West, there are a wide range of state administrative and managerial controls for mine location, production, and reclamation functions. Table 2-5 outlines some of the most important state extraction control mechanisms for the West. While

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[1] 25 C.F.R. § 177.4

[2] 42 Fed. Reg. 62637-716 (December 13, 1977).

[3] University of Florida, Center for Governmental Responsibility. Energy: The Power of the States. Gainesville, Fla.: University of Florida, 1975, p. 89.

TABLE 2-5. SUMMARY OF STATE MINE RECLAMATION CONTROLS

		Control Mechanisms					Applicability			
State	Agency	Permit Duration	Surface Owner Permission	Reclamation Plan	Public Hearing	Bonding Requirements	General Surface	Coal Surface	Uranium Surface	General Underground
Arizona	None									
Colorado	Department of Natural Resources, Land Reclamation Board	mine life		✓		✓	✓			
Montana	Department of State Lands, Board of Land Commission	1 year	✓	✓		✓		✓	✓	✓
North Dakota	Public Service Commission	3 years	✓	✓	✓	✓		✓		
New Mexico	Coal Surface Mining Commission	mine life		✓		✓		✓		
South Dakota	Conservation Commission	1 year		✓		✓	✓			
Utah	Division of Oil, Gas, and Mining, Board of Oil, Gas and Mining	N/A		✓		✓	✓			✓
Wyoming	Environmental Quality Council, Administration of Land Quality	mine life		✓		✓	✓			✓

N/A = not applicable

the specific standards differ among the eight states, general regulatory power and techniques are similar across the region.[1]

State legislation in the West generally permits the establishment of written regulations for the control of extraction functions, but all states can issue orders and conduct certain licensing and permit activities without written orders. Permits ranging from $50 to $200 per acre must be obtained from the respective state agency to surface mine in the West. In addition, developers must post a bond, the amount of which is based on the predicted reclamation costs. Most western states require bonds between $100 and $600 per acre, with a $1 thousand to $2 thousand minimum. This bond can be reclaimed on reclamation of the surface mined land (several states permit a gradual releasing of the bond, as various stages of reclamation are achieved). If mine operators default, the state agencies are then responsible for completing the reclamation process, using the money from the forfeited bond. Several states permit the funds to go into a general reclamation fund, to be used for reclamation anywhere in the state.

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[1] This discussion of state extraction controls relies heavily on three works. See U.S., Council on Environmental Quality. Coal Surface Mining and Reclamation: An Environmental and Economic Assessment of Alternatives. Washington, D.C.: Government Printing Office, 1973, pp. 35-48; National Academy of Sciences. Rehabilitation of Western Coal Lands, A Report to the Energy Policy Project of the Ford Foundation. Cambridge, Mass.: Ballinger, 1974, pp. 95-99 and 120-38; and Imhoff, Edgar A., Thomas O. Friz, and James R. LaFevers. A Guide to State Programs for the Reclamation of Surface Mined Areas, Geological Survey Circular 731. Washington, D.C.: Government Printing Office, 1976, pp. 7-29. Thus, the discussion describes state programs as they existed in 1976. States are currently in the process of revising their laws and programs in accordance with federal strip mine regulations promulgated in 1977.

The state laws also define the time in which reclamation must occur. Most commonly, reclamation activities may be postponed until after the completion of mining (this is the case in Colorado, North Dakota, Wyoming, and Montana).

Revegetation attempts are required by most western states, in the form of replanting and reseeding efforts. While there is substantial variation in the specific requirements, most of the states stipulate the objective of revegetation and the number of seeding attempts or seeding rates per acre.[1]

In addition to these common provisions, there are a number of requirements specific to only a few states in the West. For instance, the administering agencies of Montana and Wyoming consider compensation for the loss of water due to strip mining. Montana, North Dakota, and Wyoming will not grant permits for mining land which has been determined to have unique value (historical, scenic, etc.) or which cannot be reclaimed according to statutory and planning criteria.

Wyoming has baseline data collection and monitoring requirements to be performed by its controlling state agency. New Mexico, North Dakota, and South Dakota have aesthetic as well as technical criteria for rehabilitating disturbed lands. Montana and Wyoming require frequent on-site inspection of the mining and reclamation process. Finally, Montana terms its permit a "reclamation contract" which gives the state the additional enforcement option of bringing suit against the operator for breach of contract if adequate reclamation does not occur, or allows public action against the state if the state is remiss in its enforcement responsibility.

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[1] Federal regulations establish performance criteria and measures for revegetation activities; see 42 Fed. Reg. 62691 (December 13, 1977).

Given these similarities and special provisions, the following discussion outlines the state surface disturbance controls in terms of the responsible agencies, control mechanisms, and range of applicability of standards, for each of the western states.

In Montana, the Department of State Lands and the State Board of Land Commissioners are responsible for site location and approval of reclamation plans. Montana is the most explicit of the western states in establishing the approval criteria by reserving areas from strip mining (other states only specify that certain factors be considered prior to approval). Montana's list of topics for evaluating reclamation efforts includes: ecological fragility, scenic value, historic value, jeopardy to wild species, and special Indian historic value. The mine reclamation laws in Montana apply to both surface and underground operations, and the permit procedures require bonds and surface owner permission. Permit duration in Montana is one year.

The Public Service Commission is the controlling agency for resource reclamation activities in North Dakota. It is charged with the implementation of general regulations, applicable to surface mining of coal (or uranium, if that ore enriches a coal seam), which require bonding, surface owner permission, and public hearings as part of the reclamation plan. In North Dakota, the reclamation permit is issued for a three-year period.

All mining operations in Colorado must obtain a permit prior to affecting any land. The regular development and extraction mining permit, issued by the Mined Land Reclamation Board, applies to operations with affected land equal to or greater than 10 acres and/or which extract 70,000 or more tons of mineral or overburden per year. The permit is for the life of the mine.[1] Mining activities may, however, require a range of other permits, e.g., permits from the Air Pollution Control Commission, the Water Pollution Control Commission, and the Department of Health.

The Wyoming Environmental Quality Council and the Council for the Administration of Land Quality control state mine reclamation laws. Permits issued by these bodies are valid for the life of the operation (for both surface and underground activities), as long as the bonding requirements are met under the reclamation plan.

In the state of New Mexico, the permit issued by the Coal Surfacemining Commission is valid for the life of the mine if bonding requirements under the coal reclamation plan are maintained.

The South Dakota State Conservation Commission governs reclamation activities in that state. The Commission is responsible for insuring compliance (the meeting of bonding standards) with the state reclamation plan.

Utah's Division of Oil, Gas and Mining and the Board of Oil, Gas, and Mining have administrative authority over the implementation of state reclamation plans. These plans include requirements for both approval and bonding and apply to both surface and underground operations.

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[1] Colorado, Office of the Governor. Environmental Permit Directory. Denver, Colo.: Office of the Governor, 1977, p. 58.

Arizona has no surface mining statute.

2.7 OCCUPATIONAL SAFETY AND HEALTH

To this point, the social control categories have proceeded in a logical sequence--from the preparation of an EIS through land-use and siting decisions to resource exploration, acquisition and extraction rules and regulations. However, in this section and those which follow, issues which are applicable to the entire development sequence are discussed. Occupational safety and health considerations, for example, apply not only to those categories already discussed (to resource exploration and acquisition activities, for example), but they also relate to the problems of energy-related air and water pollution, water use, and solid waste disposal activities which cause safety and health impacts. The focus of this section is the safety and health danger facing laborers and the public in resource extraction and energy production functions. Occupational safety and health problems range from the hazardous conditions found in resource extraction activities such as underground coal mining to the dangers associated with nuclear power plants.

2.7.1 Federal Controls

2.7.1.1 Legal Framework

With few exceptions in the past, occupational health and safety was primarily the responsibility of the private sector and the states. Pennsylvania, for example, enacted legislation establishing basic health and safety standards for coal mines as early as 1869. However, a series of mine disasters in the early 1900s led in 1910 to the first federal investigation of the causes of occupational hazards. By 1941, the situation had not changed appreciably--the states regulated the health and safety aspects of mining but the accident rate continued to increase. As a result, Title I of the Federal Coal Mine Safety Act[1] was passed in 1941 to provide the authority for U.S. inspection of all coal mines engaged in interstate commerce. In 1946, the Federal Mine Safety Code was formulated. This was an agreement, worked out between the United Mine Workers (UMW) and the coal industry at the urging of the federal government, which provided a comprehensive safety guide for federal mine inspectors. However, it was not until 1952, with the passage of Title II of the Federal Coal Mine Safety Act,[2] that federal inspectors were given their first enforcement authority. The DOI, and specifically the BLM, was given the responsibility for these inspections. This legislation was amended in 1960 and again in 1965 to remove most state jurisdiction over mine health and safety.[3]

Conflicts between state and federal mine safety controls were finally resolved by the enactment of the 1969 Coal Mine

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[1] Federal Coal Mine Safety Act, Title I, Pub. L. 77-49, 55 Stat. 177 (1941).

[2] Federal Coal Mine Safety Act, Title II, Pub. L. 82-552, 66 Stat. 692 (1952)

[3] Freehling, Robert J. "Health and Safety Regulations," in Rocky Mountain Mineral Law Foundation, ed. The American Law of Mining. New York, N.Y.: Matthew Bender, Vol. 3, pp. 713-36 (1967).

Health and Safety Act.[1] This legislation authorized the promulgation of mandatory health and safety standards for all underground and surface coal mines, established dust and noise control criteria, required medical exams and benefits for disabled miners, and provided for research programs in coal mine health and safety to be conducted by the DOI and the Department of Health, Education, and Welfare (HEW).[2]

The Metallic and Nonmetallic Mine Safety Act of 1966[3] extended federal coverage of mining safety beyond the coal industry to other mining operations, including the extraction of uranium. This act gave the Secretary of the Interior the authority to promulgate and enforce health and safety regulations for both surface and underground uranium mines.

The standards set by the Metallic and Nonmetallic Mine Safety Act of 1966 and the Coal Mine Health and Safety Act of 1969 were brought together in the Federal Mine Safety and Health Act of 1977[4] which became effective in March of 1978. This act also provided that health and safety within mines and on mine property would fall under its jurisdiction, including uranium mines and mills.

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[1] Federal Coal Mine Health and Safety Act of 1969, Pub. L. 91-173, 83 Stat. 742.

[2] Howerton, John B. "The Federal Coal Mine Health and Safety Act of 1969," in Rocky Mountain Mineral Law Foundation, ed. Rocky Mountain Mineral Law Institute: Proceedings of the 16th Annual Institute. New York, N.Y.: Matthew Bender, 1971, pp. 539-603.

[3] Federal Metallic and Nonmetallic Mine Safety Act of 1966, Pub. L. 89-577, 80 Stat. 772.

[4] Federal Mine Safety and Health Act of 1977, Pub. L. 95-164, 91 Stat. 1290.

The major federal health and safety controls in the nuclear energy area are derived from the Atomic Energy Act of 1954.[1] It provided for the regulation of uranium milling operations, the production of uranium hexaflouride, fuel fabrication, and fuel reprocessing.

Passage of the 1970 Occupational Safety and Health Act[2] did not supersede the standards established for the coal and uranium industries. Instead, the 1970 act extended national health and safety controls to all enterprises engaged in business affecting interstate commerce. Essentially the Occupational Safety and Health Act represented a widespread feeling that "existing state safety legislation was generally weak or not well-enforced, and that variations in safety requirements across states tended to penalize those where concern for safety was strongest."[3] The Occupational Safety and Health Act provided for the issuance of interim health and safety standards for the first two years after the effective date of the act. This allowed time for the development of more comprehensive regulations which followed a detailed review process.

2.7.1.2 Administrative Authority

Federal occupational health and safety responsibilities are divided between the Departments of Labor, HEW, and Interior. The

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[1] Atomic Energy Act of 1954, Pub. L. 83-703, 86 Stat. 919, as amended by Pub. L. 91-560, 84 Stat. 1472.

[2] Occupational Safety and Health Act of 1970, Pub. L. 91-596, 84 Stat. 1590.

[3] Smith, Robert S. The Occupational Safety and Health Act: Its Goals and Achievements. Washington, D.C.: Amercian Enterprise Institute for Public Policy Research, 1976, p. 7.

Secretary of Labor, through his Assistant Secretary for Occupational Safety and Health, has overall administrative authority over the implementation of the 1970 act. The Assistant Secretary heads the Occupational Safety and Health Administration (OSHA), which sets standards, enforces compliance, and oversees state programs.[1] The Department of Labor also has administrative responsibility for health and safety policy in all mining operations through the Mine Safety and Health Administration (MSHA). HEW's National Institute for Occupational Safety and Health (NIOSH) has responsibility for research on health and safety criteria, recommends new standards, and develops health and safety manpower. The DOI Bureau of Mines has responsibility for conducting mining health and safety research for both coal, metallic and nonmetallic mining under provisions of the 1977 Act.

In addition to these major health and safety functions, the EPA plays an important role in the federal control of radiation exposure. Since 1970, the EPA has been responsible for setting exposure standards for the general public and the issuance of guidelines for those agencies which regulate mines (MSHA) and those which control nuclear power plants (NRC). The NRC monitors exposures for individuals working in nuclear facilities and controls nuclear waste disposal from nuclear power plants.

2.7.1.3 Regulatory Provisions

The OSHA has developed four different sets of standards: general industry standards; special industry standards;

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[1] Mallino, David L., and Shaun M. Werner, eds. Occupational Safety and Health: A Policy Analysis. Washington, D.C.: Government Research Corporation, 1973, p. 5.

occupational safety standards; and maritime standards. Many of these rules refer to the American National Standards Institute (ANSI) "national consensus standards." Energy facility design and safety features usually also emplcy such sources as company manuals, engineering standards, and existing codes.[1]

In addition to the regulations mandated by OSHA, other safety and health provisions are administered through interagency coordination. Within such arrangements, MSHA has set minimum mining inspection standards, penalties, and closure rules; and the NRC and EPA have provided regulations which apply to radioactive exposures ranging from radon gas in mines to transportation line radiation.

2.7.2 State Controls

Under the Federal Mine Safety and Health Act,[2] MSHA has enforcement authority for its regulations in addition to the authority held by the states.

OSHA provides for state plans to supersede federal standards and enforcement authority. If states promulgated rules as effective as OSHA's, a transition is effected from a federal program to a state-federal partnership in which the states administer their own plans within the OSHA framework. As of early 1976, as is illustrated by Table 2-6, only North Dakota, South Dakota, and Montana had not had such plans approved by the federal government. In 1978, however, the Colorado legislature withdrew its state OSHA plan as an austerity measure.

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[1] U.S., President. The President's Report on Occupational Safety and Health; Annual Report for 1973 by the U.S. Department of Labor, Occupational Safety and Health Review Commission and the U.S. Department of Health, Education, and Welfare. Washington, D.C.: Government Printing Office, 1975.

[2] Federal Mine Safety and Health Act of 1977, Pub. L. 95-164, 91 Stat. 1290.

2.8 AIR QUALITY

Concern with the environmental impacts of industrial activities in general and energy resource development in particular has been a relatively recent phenomenon in the U.S. The first major environmental issue to mobilize public opinion and governmental action was air pollution, which became a significant public policy focus in the late 1940s. In recent years, a great deal of emphasis at both the federal and state levels has been placed upon the development of control mechanisms to improve air quality.

2.8.1 Federal Controls

2.8.1.1 Legal Framework

The first major federal legislation designed to improve air quality was enacted in 1955. That year, the Air Pollution Control Act[1] mandated federal technical assistance to state and local air quality programs but left the prevention and control of air pollution from motor vehicles "at its source" with the state and local governments. In 1963, Congress passed the Clean Air Act,[2] which provided for the development of motor-vehicle-induced air quality criteria by the federal government

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[1] Air Pollution Control Act, Pub. L. 84-159, 69 Stat. 322 (1955).

[2] Clean Air Act of 1963, Pub. L. 88-206, 77 Stat. 392.

TABLE 2-6. STATUS OF STATE OSHA PROGRAMS

State	Status of Plan	Status of Standards
Arizona	Approved 11/74	Adopted Federal
Colorado	Withdrawn 4/78	
Montana	Withdrawn 6/74	
New Mexico	Approved 11/75	Adopted Federal
North Dakota	Withdrawn 7/73	
South Dakota	Not Submitted	
Utah	Approved 1/73	Adopted Federal
Wyoming	Approved 5/74	Adopted Federal

OSHA = Occupational Safety and Health Administration

(specifically HEW) to guide state and local agencies. But the 1963 act and its 1965 amendments failed to provide for any program which would establish air quality standards for pollution sources other than motor vehicles. And the 1963 act and amendments continued to place the primary responsibility for pollution control in state and local hands.

In 1967 the Air Quality Act[1] was passed. This legislation established minimum national standards for air quality. The 1967 law applied to the issue of air pollution much of the philosophy and many of the procedures developed earlier in the water quality program (discussed in the next section of this chapter). Three years later the EPA was established and the

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[1] Air Quality Act of 1967, Pub. L. 90-148, 81 Stat. 485.

1970 Clean Air Act Amendments[1] were passed. This act, while placing the burden of program development and enforcement on the states, assigned to EPA the role of supervising state plans for air pollution abatement and extended federal regulatory authority beyond mobile sources (motor vehicles) to include all sources of pollution.[2]

Additional amendments to the Clean Air Act were passed by Congress in 1977.[3] These new amendments provide a two-year extension on current standards for emissions on new automobiles, establish a policy to prevent significant deterioration of air quality, endorse EPA's "offset policy" for new or modified major sources of air pollution in areas not meeting air quality standards, and require a case-by-case definition of best available control technology on all major new sources. State implementation plans are required to be revised to include provisions at least as stringent as the federal regulations.

2.8.1.2 Administrative Authority

Under the 1970 legislation, the Administrator of the EPA was given the authority to establish national standards for specified pollution sources. In addition, the EPA engages in research, monitoring and enforcement activities and coordinates antipollution actions of state and local governments. The

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[1] Clean Air Act Amendments of 1970, Pub. L. 91-604, 84 Stat. 1976.

[2] Rosenbaum, Walter A. *The Politics of Environmental Concern*, 2nd ed. New York, N.Y.: Praeger, 1977, pp. 144-57.

[3] Clean Air Act Amendments of 1977, Pub. L. 95-95, 91 Stat. 685.

Assistant Administrator for Air and Waste Management, through the Offices of Air Quality Planning and Standards and Mobile Source Air Pollution Control, has specific authority over air quality controls.

The 1977 amendments extend EPA's authority to establish standards for ambient air quality, to set performance standards for new sources, to prescribe emission standards for hazardous air pollutants, and to resolve interstate and international conflicts over air quality. States are allowed to revise implementation plans to provide for the prevention of significant deterioration (PSD) of air quality maintenance requirements. Mobile source inspection and maintenance programs may also be established by the states.

2.8.1.3 Regulatory Provisions

The air quality criteria established by EPA are of two types: "ambient" standards which measure the quality of the atmosphere (usually at ground level) and "emission" standards measuring quantities of pollutants discharged from facilities. Federal ambient air quality regulations establish both "primary" and "secondary" standards for maximum permissible concentrations in the atmosphere of six "criteria" pollutants (suspended particulates, sulfur dioxide, carbon monoxide, nitrogen oxides, photochemical oxidants, and hydrocarbons). Primary standards are intended to identify maximum levels of each pollutants which would not be harmful to the public health, while secondary standards, which are more restrictive for sulfur dioxide and particulates, set maximum pollution levels to protect the public welfare. The federal primary and secondary ambient air quality standards for the six criteria pollutants are given in Table 2-7.

TABLE 2-7. NATIONAL AMBIENT AIR QUALITY STANDARDS[a]

Pollutant	Averaging Interval	Primary Standard µg/m³ (ppm)	Secondary Standard µg/m³ (ppm)
Sulfur Dioxide	Annually	80 (0.03)[b]	-
	24 hr	365 (0.14)[c]	-
	3 hr	-	1,300 (0.5)[c]
Particulate Matter	Annually	75[d]	60[d,e]
	24 hr	260[c]	150[c]
Carbon Monoxide	8 hr	10,000 (9)[c]	10,000 (9)[c]
	1 hr	40,000 (35)[c]	40,000 (35)[c]
Photochemical Oxidants	1 hr	160 (0.08)[c,f]	160 (0.08)[c,f]
Hydrocarbons (Nonmethane)	3 hr (6-9 a.m.)	160 (0.24)[c,f]	160 (0.24)[c,f]
Nitrogen Dioxide	Annually	100 (0.05)[b]	100 (0.05)[b]

µg/m³ = micrograms per cubic meter

hr = hour

ppm = parts per million

[a] 40 C.F.R. 50. The Environmental Protection Agency (EPA) has also proposed a primary and secondary national ambient air quality standard for airborne lead of 1.5 µg/m³, monthly arithmetic mean. Federal Register, Vol. 42 (December 14, 1977), pp. 63-076-83. The 1977 Amendments direct EPA to study radioactive pollutants, calcium, arsenic, and polycyclic organic matter for possible inclusion as criteria pollutants. Clean Air Act Amendments of 1977, Pub. L. 95-95, Sec. 122, 91 Stat. 720-21.

[b] arithmetic mean

[c] maximum concentration not to be exceeded more than once per year

[d] geometric mean

[e] for use as a guide to assess implementation plans to achieve the 24-hr standard

[f] for use as a guide in devising implementation plans to achieve oxidant standards

The 1977 Amendments established regulations for the PSD of air quality. Three classifications for clean air areas have been established. Class I areas allow the smallest increments of sulfur dioxide (SO_2) and particulates and are intended to protect the cleanest areas of the nation (e.g., national parks and wilderness areas). Class III areas allow the largest incremental increases. Table 2-8 shows the PSD standards for the three classifications including subcategories of variances to Class I standards.

TABLE 2-8. PREVENTION OF SIGNIFICANT DETERIORATION ALLOWABLE INCREMENTS

	Pollutants (in micrograms per cubic meter)				
	Total Suspended Particulates		Sulfur Dioxide		
	Annual	24-hr	Annual	24-hr	3-hr
Class I	5	10	2	5	25
Class I "relief"	19	37	20	91	325
Class I 18-day variance:					
low terrain	-	-	-	36	130
high terrain	-	-	-	62	221
Class II	19	37	20	91	512
Class III	37	75	40	182	700

hr = hour

Source: Garvey, Doris B., et al. The Prevention of Significant Deterioration: Implications for Energy Research and Development. Argonne, Ill.: Argonne National Laboratory, Office of Environmental Policy Analysis, 1978, p.9.

Emission performance standards for stationary sources are divided into two general categories: "old sources" and "new sources." New source performance standards (NSPS) set standards for six criteria pollutants which are covered by the ambient air quality rules. These broad categories are subdivided into a series of industrial classifications, each of which has a separate set of emission standards, based on economic and environmental considerations.[1] For energy related industries, NSPS have been issued for fossil fueled steam generators,[2] coal preparation plants,[3] and petroleum refineries.[4]

"Hazardous air pollutants" include those substances to which no ambient air quality standard is applicable and which, in the judgment of the EPA Administrator, "may cause or contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness."[5] This category allows even stricter standards than ambient air quality regulations. Asbestos, beryllium, mercury, and vinyl chloride are currently considered hazardous, and separate emissions levels and/or uniformly applicable control equipment requirements have been established for these materials. The 1977 Amendments allow EPA to set a design, equipment, work practice, or operational standard for hazardous materials when an emission standard is not feasible.

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[1] Ferguson, Arthur B., Jr. "Direct Federal Controls: New Source Performance Standards and Hazardous Emissions." Ecology Law Quarterly, Vol. 4 (No. 3, 1975), pp. 645-59.

[2] 40 C.F.R. §§ 60.40 *et seq.*; 41 Fed. Reg. 33966 (November 19, 1976).

[3] 40 C.F.R. §§ 60.250 *et seq.*; 41 Fed. Reg. 1240 (January 14, 1976).

[4] 40 C.F.R. §§ 60.100 *et seq*.

[5] Ferguson. "Direct Federal Controls," p. 651.

Mobile source pollutants, most notably automobile emissions, are the final area left primarily to EPA control. This program is designed to reduce emissions of hydrocarbons, carbon monoxide, and oxides of nitrogen from mobile sources.[1] The automatic emission standards established by the 1977 Amendments are shown in Table 2-9.

TABLE 2-9. AUTOMOTIVE EMISSION STANDARDS[a]

Pollutant	Year		
	1978-79	1980	1981[b]
Hydrocarbons	1.5	0.41	0.41
Carbon Monoxide	15.0	7.0	3.40[c]
Oxides of Nitrogen	2.0	2.0	1.0[d]

[a] Clean Air Act Amendments of 1977, Pub. L. 95-95, Sec. 201, 91 Stat. 751-753. Units are in gram per vehicle mile.

[b] After 1981 a reduction of at least 90 percent above the 1970 standards is required for hydrocarbons and carbon monoxide.

[c] With a possible two-year waiver to 7.0 grams per vehicle mile.

[d] With 0.4 gram per vehicle mile as a research goal.

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[1] Gurbrud, Arne E. "The Clean Air Act and Mobile-Source Pollution Control." Ecology Law Quarterly, Vol. 4 (No. 3, 1975), pp. 523-36. See also Margolis, Howard. "The Politics of Auto Emissions." The Public Interest, Vol. 49 (Fall 1977), pp. 3-21.

It must be noted that federal air quality controls are subject to continuous modification. The 1977 Clean Air Act Amendments, the most recent alterations in air quality rules, provide for variances from Class I (wilderness and parks) areas for PSD.[1] The only modification in federal control of air quality effected by the DOE reorganization was a very general and indirect reference to the assignment of an Assistant Secretary in the new department "environmental responsibilities and functions." According to the Department of Energy Organization Act,[2] these responsibilities should include "advising the Secretary with respect to the conformance of the Department's activities to environmental protection laws and principles, and conducting a comprehensive program of research and development on the environmental effects of energy technologies and programs." This provision may be the source of an administration proposal to shift some pollution control research from EPA to DOE.[3]

2.8.2 Indian Controls

While the 1970 Clean Air Act Amendments[4] did not directly mention the role of Indian tribes in air quality control, the

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[1] Kirschten, J. Dicken. "The Clean Air Conference--Something for Everybody." National Journal, Vol. 9 (August 13, 1977), pp. 1261-63. See also Hamby, James I. "The Clean Air Act and Significant Deterioration of Air Quality: The Continuing Controversy." Environmental Affairs, Vol. 5 (Winter 1976), pp. 145-74.

[2] Department of Energy Organization Act, Pub. L. 95-91, 91 Stat. 565.

[3] Mossberg, Walter S. "Carter Set to Switch Key Pollution Studies from EPA to Energy Unit, Risking Fight." Wall Street Journal, January 18, 1978, p. 7.

[4] Clean Air Act Amendments of 1970, Pub. L. 91-604, 84 Stat. 1676.

1977 Amendments,[1] under PSD, allow Indian governing bodies provisions to redesignate their reservation lands. If conflict occurs between a state and an Indian tribe over any redesignation or a permit for a new major emitting facility, the Administrator of EPA is given a role to resolve the dispute. Indian tribes may also participate in the formulation of state implementation plans (SIP).

2.8.3 State Controls

Under the 1970 act, the states are charged with enforcing air quality standards, and following the establishment of national regulations the states must present an enforcement plan. In general, states have established implementation plans which set restrictions on emissions so that federal ambient air quality standards can be met. Primary standards were designed to be met in 1977. However, there have been a number of significant delays in meeting these compliance deadlines.

Generally, the 1970 act provides for federal intervention if states fail to enforce emissions violations. After a period of thirty days, the EPA Administrator may issue a compliance order or bring civil action to force state compliance. The maximum penalties which may be assessed for violating EPA regulations are $25 thousand per day and/or one year of confinement. After the first conviction, the penalties may double.

The state governments, as part of the 1970 act requirements, are responsible for the establishment of SIP for meeting national primary and secondary air standards. Among the specific powers granted to the states in the area of air quality control are:

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[1] Clean Air Act Amendments of 1977, Pub. L. 95-95, 91 Stat. 685.

the adoption of emission standards required to attain national criteria; the enforcement of applicable laws and the option of seeking injunctive relief; the abatement of pollutant emissions to prevent danger to the public health; the prevention of the contruction of any energy facility which may constrain the attainment of national air quality standards; the monitoring of the performance of facilities; and the requiring of monitoring devices by owners of stationary sources.

Each of the eight western states initially developed an approved SIP which included emission limitations, land-use and transportation controls, methods for funding, provisions to prevent significant deterioration, and a timetable for the attainment of the primary and secondary standards. Also included were interim dates for intermediate pollutant levels to provide for eventual compliance. However, since the date for the attainment of the primary standards has passed without compliance, the EPA has decided to call for new SIP.

The requirements of SIP have changed as a result of passage of the Clean Air Act Amendments of 1977,[1] and new SIP must be prepared within nine months of the promulgation of the Clean Air Act Amendments of 1977 regulations. These regulations are expected to be promulgated during the summer of 1978.

In seeking to maintain or improve air quality, states have at their disposal two types of permit procedures which may be included in the SIP: construction permits and operation permits. The most commonly utilized permits have been those related to the construction or installation of sources. Construction permits for point sources of emissions in the western states are issued for periods ranging from one year (in Colorado) to two years (in most of the other states), as is shown in Table 2-10. If at the end of that time, the permit holder has not begun construction or if installation has been delayed, the permit may be cancelled. A construction permit may not be granted if the air pollution control agency in the state (usually an independent air quality board or commission, but also often the state health or environmental protection agency in the western states) determines that any of the federal, state, or local air pollution standards will not be met.

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[1] Clean Air Act Amendments of 1977, Pub. L. 95-95, 91 Stat. 685.

Many of the western states have set emission standards which are more stringent than the federal NSPS. The standards applicable to sulfur dioxide emissions are shown in Table 2-11. Wyoming also has a nitrogen oxides emission limit of 0.70 pounds per million Btu (British thermal unit) heat input for new solid fossil fuel (except lignite) fired equipment.

Most states require that the emission source be built and equipped exactly as specified in the plans approved in the construction permit. The penalty for noncompliance with the construction permit is refusal of an operating permit. Procedural flexibility usually allows the state agency to grant a conditional operating permit if the pollution source is not remaining within the expected standards. Some states do require a performance test to be successful prior to granting the operating permit. In the western states, operating permits range from a one-year duration (Arizona) to three years (North Dakota). Most other states in the West do not specify the duration of operating permits.

TABLE 2-10. STATE AIR POLLUTION PERMITS

State	Agency	Duration of Permits		
		Installation	Operation	Conditional-Temporary
Arizona	Air Pollution Control Division[a]	2 years	1 year	1 year-90 days
Colorado	Air Pollution Control Commission	1 year	2 years[b]	6 months
Montana	Department of Health and Environmental Science	2 years[c]	not specified	1 year
North Dakota	Department of Health	1.5 years	3 years	not specified
New Mexico	Environmental Improvement Agency	not specified[d]	not required	1 year
South Dakota	Department and Board of Environmental Protection	2 years[e]	not specified	not specified
Utah	Air Conservation Committee	not specified	not required	1 year
Wyoming	Air Quality Division, Environmental Quality Department	2 years	not specified	unknown

[a] This agency only for sources emitting over 75 tons of air contaminants per day. For other sources, see local-county air boards.

[b] A performance test is required before the actual operation is allowed, but usually this is discretionary.

[c] This construction permit is required for both new sources and new installations of equipment on old sources.

[d] This state may require a certificate of compliance in lieu of granting an installation permit.

[e] This permit required only for sources emitting over 10 pounds of contaminates per hour or 25 tons per year.

TABLE 2-11. STATE SO_2 EMISSION STANDARDS

State	Applicability	Emission Regulation
Arizona	Existing New	1.0# SO_2/MMBtu 0.8# SO_2/MMBtu
Colorado	Existing New	1.2# SO_2/MMBtu 0.4# SO_2/MMBtu (for facilities > 250 MMBtu/hr)
Montana	New	1# S/MMBtu plus maximum control capability which is technically practicable and economically feasible as determined by Air Quality Bureau
New Mexico	New	65 percent SO_2 control
North Dakota		none other than Federal NSPS
South Dakota		none other than Federal NSPS
Utah		none other than Federal NSPS
Wyoming (State regulations, not part of SIP)	New	0.2# SO_2/MMBtu

# = pound
SO_2 = sulfur dioxide
MMBtu = million British thermal units
> = greater than

hr = hour
S = sulfur
NSPS = New Source Performance Standards
SIP = state implementation plan

Source: Crenshaw, John, et al., Alternatives for Revising the SO_2 New Source Performance Standard for Coal-Fired Steam Generators, Staff Study. Research Triangle Park, N.C.: U.S., Environmental Protection Agency, Office of Air Quality Planning and Standards, Strategies and Air Standards Division, Energy Strategies Branch, 1976, updated to mid-1978.

Also included in the SIP are state ambient air quality standards. Each of the western states has complied with this requirement by establishing standards for the six "criteria" pollutants identified by EPA. Tables 2-12 through 2-17 identify the ambient air quality standards for sulfur dioxides, particulates, carbon monoxide, photochemical oxidants, hydrocarbons, and nitrogen dioxide for each of the eight states in the West. Most of these state standards (established in terms of annual mean or maximum concentration) are set at or below the primary federal ambient air criterion. For example, the levels established for sulfur dioxide in the West are set below the federal primary standards for annual arithmetic mean and maximum 24-hour concentration by every state except Utah (which has standards set at exactly the federal level). Basically, the same situation characterizes the state criteria for each of the other pollutants. The state of Colorado has enacted PSD provisions similar to the federal standards for sulfur dioxide.

In addition to the ambient air quality standards for these six major pollutants, some western states have established criteria for other substances. Montana, North Dakota, and Wyoming have promulgated regulations for such pollutants as dustfall, sulfation, and hydrogen sulfides. The information regarding these additional air quality standards is outlined in Table 2-18. This table also shows that some western states have enacted restrictions on pollutants ranging from haze to beryllium and flourides.

Finally, states have issued emission limitations to obtain the national ambient standards. Table 2-19 summarizes the western states' emissions limitations. Following the federal example for regulating certain stationary sources, most western states have emission regulations for particulates, sulfur dioxide, and

TABLE 2-12. STATE AMBIENT AIR QUALITY STANDARDS FOR SULFUR DIOXIDES

	Standards (In Micrograms/Cubic Meter)		
Area	Annual Arithmetic Mean	Maximum 24-hour Concentration (not to be exceeded more than once per year)	Maximum 3-hour Concentration (not to be exceeded more than once per year)
Federal Primary	80	365	1300
Arizona	50	260	1300
Colorado[a]	25	300	700
Category I[b]	2	10	15
Category II[b]	5	50	100
Category III[b]	25	300	700
Montana[c]	23 (.02 ppm)	115[d] (.10 ppm)	
North Dakota[e]	60	260[f]	1300
New Mexico	60	260	1300
South Dakota	60	260	1300
Utah	80	365	1300
Wyoming	60	260	1300

ppm = parts per million

[a] Colorado also has separate standards for Air Quality Control Regions (Denver, etc.)

[b] Above a baseline as measured on October 27, 1977. Category I areas are national parks and monuments, the remainder of the state is designated Category II, and provisions for changing designations are included.

[c] Montana has a one-hour standard of 0.25 ppm not to be exceeded for more than one hour in any four consecutive days.

[d] Not to be exceeded in over one percent of days in any three-month period.

[e] North Dakota has one-hour standard of 715 micrograms per cubic meter (μ/m^3) of air, maximum one-hour concentration.

[f] Maximum one-hour concentration not to be exceeded.

TABLE 2-13. STATE AMBIENT AIR QUALITY STANDARDS FOR PARTICULATES

Area	Standards (In Micrograms/Cubic Meter)	
	Annual Geometric Mean	Maximum 24-hour Concentration (not to be exceeded more than once per year)
Federal		
Primary	75	260
Secondary	60	150
Arizona	60	100
Colorado[a]	45	150
Montana	75	200[b]
North Dakota	60	150
New Mexico	60	150[c]
South Dakota	60	150
Utah	90[d]	150
Wyoming	60	150

[a] Colorado also has separate standards for Air Quality Control Regions (Denver, etc.)

[b] Not to be exceeded more than one percent of the days of the year.

[c] New Mexico has an additional seven day average in this category (of 110 micrograms per cubic meter [μg/m^3]) and a thirty day average of 90 μg/m^3.

[d] Also not more than one percent of samples between April 1 and October to be over 200 μg/m^3 or five percent over that figure the remainder of the year.

TABLE 2-14. STATE AMBIENT AIR QUALITY STANDARDS FOR CARBON MONOXIDE

	Standards (In Micrograms/Cubic Meter)	
Area	Maximum 8-hour Concentration (not to be exceeded more than once per year)	Maximum 1-hour Concentration (not to be exceeded more than once per year)
Federal		
Primary	10,000	40,000
Secondary	10,000	40,000
Arizona	10,000	40,000
Colorado[a]	10,000	40,000
Montana	10,000	40,000
North Dakota	10,000	40,000
New Mexico	10,000	15,000
South Dakota	10,000	15,000
Utah	10,000	40,000
Wyoming	10,000	40,000

[a] 15 minute average of 100 parts per million set for Eisenhower Tunnel.

TABLE 2-15. STATE AMBIENT AIR QUALITY STANDARDS FOR PHOTOCHEMICAL OXIDANTS

	Standards (In Micrograms/Cubic Meter)
Area	Maximum 1-hour concentration (not to be exceeded more than once per year)
Federal	
Primary	160
Secondary	160
Arizona	160
Colorado	160
Montana	160
North Dakota	160
New Mexico	0.06 ppm
South Dakota	125
Utah	160
Wyoming	160

ppm = parts per million

TABLE 2-16. STATE AMBIENT AIR QUALITY STANDARDS FOR HYDROCARBONS

Area	Standards (In Micrograms/Cubic Meter)
	Maximum 3-hour Concentration (not to be exceeded more than once per year)
Federal	
Primary	160
Secondary	160
Arizona	160
Colorado	160
Montana	160
North Dakota	160
New Mexico	160
South Dakota	125
Utah	160
Wyoming	160

TABLE 2-17. STATE AMBIENT AIR QUALITY STANDARDS FOR NITROGEN OXIDE

Area	Standards (In Micrograms/Cubic Meter)		
	Annual Arithmetic Mean	Maximum 1-hour Concentration (not to be exceeded over one percent of the time in any three-month period)	Maximum 24-hour Concentration (not to be exceeded more than once per year)
Federal			
Primary	100		
Secondary	100		
Arizona	100		
Colorado	100		
Montana	100		
North Dakota	100	200	
New Mexico	100		200
South Dakota	100		250
Utah	100		
Wyoming	100		

TABLE 2-18. ADDITIONAL STATE AMBIENT AIR QUALITY STANDARDS[a]

	State							
Pollutant	Arizona	Colorado	Montana	North Dakota	New Mexico	South Dakota	Utah	Wyoming
Dustfall[b]			15/30	15/30				5/10
Coefficient of[c] Haze				0.4	0.4	0.2		0.4
Sulfation[d]			0.25/ 0.50	0.25/ 0.50				0.25/ 0.50
Suspended[e] Sulfate			4.0/ 12.0	4.0/ 12.0				
Sulfuric Acid[f] Mist			4/12/ 30	4/12/ 30				0.28/[g] 0.5
Hydrogen Sulfide			0.3/[g] 0.5	0.32/[g] 0.54	0.3[h]			40/70 $\mu g/m^3$
Lead[i]			5.0					
Beryllium[j]			0.01					
Flourides[k]			0.80/ 0.3					0.80/ 0.3

$\mu g/m^3$ = micrograms per cubic meter

[a] Blanks indicate no standard.

[b] Measured in tons per square mile per month, three-month average.

[c] Cohs per 1,000 linear feet, maximum annual geometric mean.

[d] Top figure: annual average; bottom figure: one month maximum. Both figures in milligrams of sulfur trioxide per 100 square centimeters.

[e] Top figure: maximum annual average; bottom figure: maximum 24-hour concentration not to be exceeded more than one percent of the time. Both figures in micrograms per cubic meter.

[f] Maximum arithmetic annual average; maximum 24-hour concentration not to be exceeded more than one percent of the time; and hourly average not to be exceeded over one percent of the time; respectively. All figures in micrograms per cubic meter.

[g] Top figure: not to be exceeded more than twice in any five consecutive days; bottom figure: not to be exceeded more than twice a year. All figures in 1/2 hour averages in parts per million (ppm).

[h] ppm 1-hour average.

[i] Micrograms per cubic meter, 30-day average.

[j] Micrograms per cubic meter, 30-day average.

[k] Top figure: hydrogen flourides, measured in micrograms per cubic meter, 24-hour average; bottom figure: gaseous flourides, measured in micrograms per cubic centimeter, maximum 30-day value.

TABLE 2-19. SUMMARY OF STATE EMISSION LIMITATIONS

Pollutant	State Arizona	Colorado	Montana	North Dakota	New Mexico	South Dakota	Utah	Wyoming
Particulates								
Visible	✓	✓	✓	✓	✓	✓	✓	✓
Fugitive Dust	✓	✓	✓	✓				✓
Fuel Burning	✓	✓	✓	✓	✓	✓		✓
Processes	✓	✓	✓	✓	✓	✓		✓
Diesel Engine[a]	✓	✓			✓	✓		✓
Diesel Locomotive	✓	✓			✓			✓
Gas Engines	✓	✓				✓	✓	✓
Sulfur								
Fuel Burning	✓	✓	✓	✓	✓	✓	✓	✓
Acid Plants	✓			✓				✓
General Acid		✓		✓				✓
Processes		✓		✓		✓	✓	
Volatile Organic								
Storage	✓	✓	✓	✓				✓
Transfer	✓	✓	✓	✓				✓
Other (pumps)[b]	✓	✓	✓	✓				✓
Carbon Monoxide								
Industrial	✓			✓				✓
Nitric Oxides								
Fuel Burning	✓	✓		✓	✓	✓		✓
Odors								
General		✓	✓			✓		✓

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[a] Applies to off-highway vehicles only.

[b] Emission limitations for pumping and handling volatile liquids.

nitrogen oxides from fossil-fueled steam generators. Among the mobile sources, diesel and gasoline engines are commonly regulated by SIP. Certain industries, such as petroleum refining, are the focus of state emission standards. As was the case with state ambient air quality criteria, state emission standards are usually set below the required federal level. Tables 2-18 through 2-25 provide a more detailed description of these state emission standards.

TABLE 2-20. STATE EMISSION LIMITATIONS FOR VISIBLE PARTICULATES

State	Limitations[a]
Arizona	Number 2 Ringleman
Colorado	20 percent opacity except for 40 percent during experimental operation of a plant for up to 3 minutes per hour
Montana	Number 1 Ringleman
New Mexico	Number 1 Ringleman, except for 1 minute of 30 minutes
North Dakota	Number 1 Ringleman, except for 4 minutes of 60 minutes
South Dakota	Number 1 Ringleman, or 20 percent opacity except for Number 3 Ringleman, or 60 percent opacity for 3 minutes of 60 minutes
Utah	Number 1 Ringleman, or 20 percent opacity
Wyoming	20 percent opacity, except 40 percent for up to 6 minutes per hour

[a] A Ringleman is an index value to compare visibility interference from plumes. The index is based on a set of progressively darker shades that represent opacity and can be compared with a plume. A Ringleman value of 1 is near 20 percent plume opacity; 2 equals 40 percent opacity; 3 equals 60 percent opacity.

TABLE 2-21. STATE EMISSION LIMITATIONS FOR FUGITIVE DUST PARTICULATES

State	Limitations
Arizona	No construction action to be taken without using reasonable precautions to prevent fugitive dust.
Colorado	Less than or equal to 20 percent opacity and no visible dust to extend over property line. Except open mines are allowed to exceed the opacity limit for 3 minutes per hour if the wind is over 30 mph. Also, no more than 1 acre of land can be disturbed for an open mine unless dust control procedures are used. A permit is required for new source fugitive dust and will be granted only if the control procedures will be used (dust palliative added, loads covered or wetted, speed controlled, etc.). For certain parts of the state an additional permit is required for unpaved roads or parking lots; if over 165 vehicles per 3 days, then dust control procedures must be used.
Montana	No person shall cause construction to raise dust without reasonable prevention procedures.
New Mexico	No specific regulation
North Dakota	No person shall create airborne particulates unless preventative measures are used such as water, covered loads, oil, etc.
South Dakota	No specific regulation
Utah	No specific regulation
Wyoming	Fugitive dust shall be controlled by covers, wetting, etc.

mph = miles per hour

TABLE 2-22. STATE EMISSION LIMITATIONS FOR FUEL BURNING PARTICULATES

State	Limitations[a]
Arizona	Based on Btu output, computed on a complex table
Colorado	0.5 pounds per million Btu input, decreasing to 0.1 pounds per million Btu input for large plants
Montana	Based on graphed relationships
New Mexico	No general regulation
North Dakota	Based on graphed relationships; 0.10 pounds per million Btu heat input
South Dakota	3 pounds per million Btu of heat input
Utah	None
Wyoming	None

Btu = British thermal unit

[a] In this situation, the fuel is burned for indirect heating (producing steam or hot water) and not where there is direct contact between the heat and the product.

TABLE 2-23. STATE EMISSION LIMITATIONS FOR DIESEL ENGINE PARTICULATES

State	Limitations[a]
Arizona	General: Number 2 Ringleman. Off-highway: exempt from Number 2 Ringleman emission limitation for visible particulates for 10 seconds at a time. Locomotive: exempt from Number 2 Ringleman emission limitation for 40 seconds. Also exempt from the same limitations: for 4 minutes after loading; for 30 minutes after cold start; for 3 minutes during adjustment; or if over 5,000 feet elevation where a Number 2.5 Ringleman applies.
Colorado	General: over 8,000 feet elevation, 10 seconds of 30 percent opacity; under 8,000 feet elevation, 10 seconds of 40 percent opacity. Off-highway: exempt from the general standard for 15 minute blocks (nonconsecutive). Locomotive: over 6,000 feet elevation, less than or equal to 20 percent opacity, with exceptions for 30 minutes after cold start; 10 minutes per hour during adjustment; 4 minutes after loading.
Montana	None
New Mexico	General: over 8,000 feet elevation, less than or equal to Number 1.5 Ringleman, except for 10 second block; under 8,000 feet elevation, less than or equal to Number 2 Ringleman, except for 10 second block. Exceptions include cold start or oil well drilling or servicing rigs. Off-highway: exempt from general limitation above. Locomotive: over 8,000 feet elevation, Number 1 Ringleman, except for 10 seconds.
North Dakota	None
South Dakota	General: less than or equal to Number 1 Ringleman, or 20 percent opacity except for 15 seconds.
Utah	General: less than or equal to Number 1 Ringleman, except for 3 minutes every hour.
Wyoming	General: below 7,500 feet elevation, less than or equal to 20 percent opacity, except less than or equal to 30 percent opacity for up to 10 seconds. Exceptions: cold starts, adjustments. No source may exceed 40 percent opacity for more than 6 minutes per hour.

[a] A Ringleman is an index value to compare visibility interference from plumes. The index is based on a set of progressively darker shades that represent opacity and can be compared with a plume. A Ringleman value of 1 is near 20 percent plume opacity; 2 equals 40 percent opacity; 3 equals 60 percent opacity.

TABLE 2-24. STATE EMISSION LIMITATIONS FOR GASOLINE ENGINE PARTICULATES

State	Limitations[a]
Arizona	None
Colorado	4-cycle: less than or equal to 5 seconds of visible contaminant; 2-cycle: less than or equal to 20 percent opacity, except for 10 seconds; operating permit required for engines over 1,000 hp.
Montana	None
New Mexico	None
North Dakota	None
South Dakota	Less than or equal to Number 1 Ringleman, or 20 percent opacity, except for 15 seconds.
Utah	Less than or equal to Number 1 Ringleman, or 20 percent opacity, except for 3 minutes per hour.
Wyoming	Less than or equal to 20 percent opacity, except for 5 seconds.

hp = horsepower

[a] A Ringleman is an index value to compare visibility interference from plumes. The index is based on a set of progressively darker shades that represent opacity and can be compared with a plume. A Ringleman value of 1 is near 20 percent plume opacity; 2 equals 40 percent opacity; 3 equals 60 percent opacity.

TABLE 2-25. STATE EMISSION LIMITATIONS FOR GENERAL SULFUR

State	Limitations
Arizona	Less than or equal to 10 percent of input sulfur emitted into the air
Colorado	Less than or equal to 500 ppm sulfur (all forms) from any process and not more than 5 tons per day from any one plant unless emitted at less than or equal to 150 ppm levels.
Montana	None
New Mexico	None
North Dakota	None
South Dakota	Sulfur emissions from industrial processes should not exceed the sulfur ambient levels.
Utah	For new installations with potential sulfur emissions over 250 tons per year as a gas or mist, they must install such controls as will keep discharges less than or equal to 20 percent of input sulfur.
Wyoming	None

ppm = parts per million

TABLE 2-26. STATE EMISSION LIMITATIONS FOR CARBON MONOXIDE

State	Limitations
Arizona	No carbon monoxide emissions from industrial processes without the use of complete secondary combustion.
Wyoming	No carbon monoxide emissions shall exceed the ambient standard.

TABLE 2-27. STATE EMISSIONS LIMITATIONS FOR ODORS

State	Limitations
Arizona	None
Colorado	No odors allowed over residential-commercial areas which are detectable after dilution with seven volumes of air, unless the best practicable technology is used. For all other lands the test is conducted with 15 volumes, but in no case is an odor to be detectable after dilution with 127 volumes of air.
Montana	Odors shall not extend beyond the property line of the source.
New Mexico	None
North Dakota	None
South Dakota	If the majority of a designated panel of five people agrees that an odor unreasonably interferes with the enjoyment of life or property, the owner of the source shall comply with suggestions of the panel.
Utah	None
Wyoming	Odors shall not be detectable beyond the property line after dilution with seven volumes of air.

The 1977 Amendments[1] require SIP to include permit programs to prevent significant air quality deterioration and nonattainment of standards and also to include air quality maintenance requirements to go into effect by July 1, 1979. SIP revised after that date must assure attainment of national ambient air quality standards for all pollutants by December 31, 1982. If attainment of standards for photochemical oxidants or carbon monoxide is not possible by 1982, a second plan revision must be submitted to insure attainment by December 31, 1987. The SIP revision must specify the amount of new source growth to be permitted. New sources must achieve the lowest achievable emission rate, and SIP must require reasonably available control measures for existing sources. If a state's implementation plan after July 1, 1979 does not provide for compliance, EPA may not allow new preconstruction permits, may halt sewage construction grants, and may withhold new highway funds from that state.

2.9 WATER QUALITY

While the first water quality regulations date back to the 1980's, it was another 70 years before water pollution came to be viewed as a serious national problem. As was noted above, water quality policies which evolved in the U.S. in the decade after 1965 served as a model for much of the air quality and environmental protection legislation passed in the 1970's.

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[1] Clean Air Act Amendments of 1977, Pub. L. 95-95, 91 Stat. 685.

2.9.1 Federal Controls

2.9.1.1 Legal Framework

The federal law affecting water quality originated with the 1899 Rivers and Harbors Act[1] (also known as the "Refuse Act") which made it unlawful to discharge any refuse except liquid sewage into navigable waters or to leave any refuse on the banks of such navigable waters.[2] The 1924 Oil Pollution Act,[3] directed toward the control of oil spills, placed more restrictive standards on the pollution of navigable waters by petroleum carriers.[4] In 1948, the Water Pollution Control Act[5] was passed. This legislation mandated the monitoring of the quality of navigable waters, but it did not establish water permits or standards.

The Federal Water Pollution Control Act was amended in 1956, 1961, 1965, 1966, 1970, 1972, and 1977.[6] This series of acts is the legal backbone for clean water, providing for wastewater treatment construction and other grants, standards, enforcement procedures, and research programs. This legislation was largely a response to the inability of the states to adequately control pollution problems on interstate or navigable waters.

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[1] Rivers and Harbors Act of 1899, Pub. L. 55-425, 30 Stat. 1121.

[2] Beatty, Haradon. "Federal Water Pollution Control in Transition," in Rocky Mountain Mineral Law Foundation, ed. _Rocky Mountain Mineral Law Institute: Proceedings of the 18th Annual Institute_. New York, N.Y.: Matthew Bender, 1973, p. 497.

[3] Oil Pollution Act of 1924, Pub. L. 68-238, 43 Stat. 604.

[4] Ross, William M. _Oil Pollution as an International Problem_. Seattle, Wash.: University of Washington Press, 1973, p. 82.

[5] Water Pollution Control Act, Pub. L. 80-845, 62 Stat. 1155.

[6] The name was changed to the Clean Water Act by the 1977 amendments, Pub. L. 95-217, 91 Stat. 1566.

Other federal legislation of particular importance to western energy development are: the 1973 memorandum of agreement between the U.S. and Mexico regarding the salinity of the Colorado River,[1] the 1974 Colorado River Basin Salinity Control Act,[2] and the 1974 Safe Drinking Water Act.[3] The memorandum of agreement with Mexico had the effect of limiting the salinity of the Colorado River water flowing into Mexico, while the Colorado River Salinity Control Act authorized the construction, operation and maintenance of certain works in the Colorado River Basin to control water salinity. Consistent with that legislation, in December 1974, EPA, under the authority of Section 303 of the Federal Water Pollution Control Act (FWPCA) Amendments of 1972,[4] published a regulation requiring that the average salinity in the Lower Colorado River be maintained at or below the 1972 level. This standard was 723 milligrams per liter (mg/ℓ) below Hoover Dam, 747 mg/ℓ below Parker Dam, and 879 mg/ℓ below Imperial Dam.[5]

The Safe Drinking Water Act established goals to protect public health and welfare and implemented procedures to protect

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[1] Minute No. 241, Department of State Bulletin, Vol. 67 (1972), p. 198.

[2] Colorado River Basin Salinity Control Act of 1974, Pub. L. 93-320, 88 Stat. 266.

[3] Safe Drinking Water Act of 1974, Pub. L. 93-523, 88 Stat. 1660.

[4] Federal Water Pollution Control Act Amendments of 1972, Pub. L. 92-500, 86 Stat. 816.

[5] 41 Fed. Reg. 13656-57 (March 31, 1976).

TABLE 2-28. MAXIMUM ORGANIC AND INORGANIC CONTAMINANT LEVELS ALLOWABLE IN DRINKING WATER

Contaminant	Level (mg/liter)
Inorganic	
Arsenic	0.0500
Barium	1.0000
Cadmium	0.0100
Chromium	0.0500
Lead	0.0500
Mercury	0.0020
Nitrate	10.0000
Selenium	0.0100
Silver	0.0500
Organic	
Endrin	0.0002
Lindane	0.0040
Methoxychlor	0.1000
Toxaphene	0.0050
Chlorophenoxys	0.1000
2,3,5-TP Silvex	0.0100

mg/liter = milligrams per liter

Source: Safe Drinking Water Act of 1974, Pub. L. 93-523, 88 Stat. 1660.

public drinking water. The act, which significantly extended the authority of the EPA, is applicable to any water supply with at least fifteen connections or which regularly serves 25 individuals daily for at least 60 days per year. The 1974 act provides for state enforcement of regulations which became effective in mid-1977. And this law requires the promulgation of national underground wastewater and fluid injection regulations. Tables 2-28 through 2-31 identify the maximum contaminant levels for inorganic, organic, turbidity, microbiological, radioactive, and fluoride pollutants permitted under the Safe Drinking Water Act.

TABLE 2-29. MAXIMUM TURBIDITY AND MICROBIOLOGICAL CONTAMINANT LEVELS ALLOWABLE IN DRINKING WATER

Contaminant	Level
Turbidity[a]	The monthly average should be less than one turbidity unit (TU), except that up to five TU's will be allowed if demonstrated that the high turbidity will not affect disinfection.
Microbiological	Coliform numbers shall not exceed any one of the following: (1) one per 100 mℓ as the arithmetic mean of all samples examined per month (2) four per 100 mℓ in more than one sample when less than 20 are examined per month (3) four per 100 mℓ in more than five percent of the samples when 20 or more are examined per month.[b]

mℓ = milliliters

Source: Safe Drinking Water Act of 1974, Pub.L. 93-523, 88 Stat. 1660.

[a] Applies only to water systems using surface water in whole or in part.

[b] The standards listed are for the membrane filter technique, although standards for other analytical methods are available. More than 20 samples per month are required for communitites over 18,000 population.

TABLE 2-30. MAXIMUM RADIOACTIVE CONTAMINANT LEVELS ALLOWABLE IN DRINKING WATER

Contaminant	Level (pCi/ℓ)
Combined radium-226 and radium-227	5
Gross alpha particle activity (including radium-226, but excluding radon and uranium)	15
Tritium (total body)	20,000
Strontium-90 (bone marrow)	8

pCi/ℓ = picocurries per liter

Source: Safe Drinking Water Act of 1974, Pub. L. 93-523, 88 Stat. 1660.

TABLE 2-31. MAXIMUM FLOURIDES CONTAMINANT LEVELS ALLOWABLE IN DRINKING WATER

Maximum Daily Air Temperature At Water System Site		Levels of Flourides (in milligrams/liter)
Fahrenheit	Celsius	
53.7 and below	12.0 and below	2.4
53.8 to 58.3	12.1 to 14.6	2.2
58.4 to 63.8	14.7 to 17.6	2.0
63.9 to 70.6	17.7 to 21.4	1.8
70.7 to 79.2	21.5 to 26.2	1.6
79.3 to 90.5	26.3 to 32.5	1.4

Source: Safe Drinking Water Act of 1974, Pub. L. 93-523, 88 Stat. 1660.

As was the case with air quality controls, the standards for water quality at the federal level are subject to constant modifications. With the FWPCA Amendments of 1972, the federal government's water quality program set goals of: water clean enough for boating and fishing by 1977; water clean enough for swimming by 1983; and zero discharge of pollutants into navigable water by 1985.[1] Additional amendments passed in late 1977 extend the 1977 and 1983 deadlines by one year, and make adjustments in standards and permitting procedures.[2]

2.9.1.2 Administrative Authority

The 1965 Water Quality Act[3] created the Water Pollution Control Administration to oversee federal water quality programs. In 1966, this function was transferred to the DOI and in 1970 to EPA. The FWPCA provided for the establishment of a national system of permits to be issued by either the EPA or the states with EPA approval. The permit must specify the substances to be discharged and how and during what time period water quality will be affected. State programs must include standards for monitoring, reporting, and enforcement. And EPA may require specified minimum levels of personnel and funding. However, states are authorized to promulgate standards which are no less stringent than those specified by EPA.

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[1] Federal Water Pollution Control Act Amendments of 1972, Pub. L. 92-500, 86 Stat. 816, 33 U.S.C.A. §§ 1251 et seq. (Supp. 1976).

[2] Clean Water Act of 1977, Pub. L. 95-217, 91 Stat. 1566.

[3] Water Quality Act of 1965, Pub. L. 89-234, 79 Stat. 903.

The requirements of the FWPCA do not supersede water quality standards affecting navigation under the 1899 Rivers and Harbors Act[1] but modify their administration. The Army COE continues to play a role in the administration of water quality controls through its authority to issue permits for dredging and filling near navigable streams with flows greater than three cubic feet per second,[2] but discharge permits are not issued by EPA, as discussed below.

2.9.1.3 Regulatory Provisions

A two-part program was adopted in FWPCA for the application of effluent limitations. First, by July 1978, all "point source" dischargers (municipal and industrial facilities) must apply the "best practicable technology" (or BPT) for pollution control. The BPT standard establishes effluent limitations based primarily on the state-of-the-art of practical pollution control technologies in specific industries or municipalities. The current primary and secondary effluent regulations are shown in Tables 2-32 and 2-33. That is, EPA establishes BPT effluent limitations for discharges as criteria for permit evaluation under procedures termed the National Pollution Discharge Elimination System (or NPDES). Permits issued under NPDES allow the state and federal governments to regulate water pollution according to the problems faced by various industries and municipalities and the technologies available for resolving pollution problems.

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[1] Rivers and Harbors Act of 1899, Pub. L. 55-425, 30 Stat. 1121.

[2] Federal Water Pollution Control Act Amendments of 1972, Pub. L. 92-500, § 404, 86 Stat. 884.

TABLE 2-32. CURRENT EFFLUENT REGULATIONS OF THE FEDERAL WATER POLLUTION CONTROL ACT[a]

Type of Facility or Pollutant	Treatment Required
Industrial	-"best practicable control technology currently available" as defined by the EPA administrator by July 1, 1978.[b] -"best available technology economically achievable" as determined by the EPA administrator by July 1, 1984.[b] Limits are based on categories or classes of industries. -National performance standards--including zero-discharge, if practicable--for each new category of source.
Municipal	-Effluent limitations based on secondary treatment by July 1, 1978.[b] -best practicable technology over the life of the works by July 1, 1984.[b]
Toxic Pollutants (seriously harmful to human or other life)	-Effluent limitations including prohibition of discharge, if needed, to provide "an ample margin of safety" set by the EPA administrator.
Radiological, Chemical or Biological Warfare Agents or High Level Radioactive Waste	-Discharge prohibited
Thermal Discharges	-Effluent limitations set to ensure a balanced population of fish, shellfish and wildlife.
Oil or Hazardous Substances	-No discharge into U.S. waters, adjoining shorelines or contiguous zone waters.

[a] Federal Water Pollution Control Act Amendments of 1972, Pub. L. 92-500, 86 Stat. 816. Adopted from Congressional Quarterly, Inc. Congress and the Nation, Vol. III: 1969-1972. Washington, D.C.: Congressional Quarterly, 1973, p. 797.

[b] Data reflects the change in the law made by the Clean Water Act of 1977, Pub. L. 95-217, 91 Stat. 1566.

TABLE 2-33. SECONDARY TREATMENT STANDARDS

Materials	Treatment
BOD_5	(1) The arithmetic mean of values for effluent samples collected in a period of 30 consecutive days shall not exceed 30 mg/ℓ. (2) The arithmetic mean of values for effluent samples collected in a period of 7 consecutive days shall not exceed 43 mg/ℓ. (3) The arithmetic mean of values for effluent samples collected in a period of 30 consecutive days shall not exceed 15 percent of the arithmetic mean of values for influent samples collected at approximately the same time during the same period (85 percent removal).
Suspended Solids	(1) The arithmetic mean of values for effluent samples collected in a period of 30 consecutive days shall not exceed 30 mg/ℓ. (2) The arithmetic mean of values for effluent samples collected in a period of 7 consecutive days shall not exceed 45 mg/ℓ. (3) The arithmetic mean of values for effluent samples collected in a period of 30 consecutive days shall not exceed 15 percent of the arithmetic mean of values for influent samples collected at approximately the same times during the same period (85 percent removal).
Fecal Coliforms	(1) The geometric mean of values for effluent samples collected in a period of 30 consecutive days shall not exceed 200 per 100 mℓ. (2) The geometric mean of values for effluent samples collected in a period of 7 consecutive days shall not exceed 400 per 100 mℓ.
pH	The effluent values of pH shall be maintained within the limits of 6.0 and 9.0.

BOD = biochemical oxygen demand
mg/ℓ = milligrams per liter
mℓ = milliliters
pH = measure of the acidity of a solution

The second phase of the federal water quality program will move beyond BPT standards to require each industry or city to reach "best available technology" (BAT) criteria by 1984. BAT standards are based on industries or municipalities accepting those control technologies which are economically achievable and which will result in reasonable progress toward the national goal of eliminating effluent discharges. The ultimate goal of the federal effort is to have BAT standards eliminate pollutant discharges by 1985.[1]

An important exception to these regulatory provisions is the separate standard for "new sources." A new source is defined as a process or operation which has been constructed or substantially modified after the EPA has adopted the effluent standards for that type of industry discharge. New source permits require BAT standards, and they exempt the operation from future changes or modifications in the regulations for ten years.[2]

Individual discharge permits are generally evaluated against a specific BPT. For technologies without specific effluent limitations, state effluent or water quality standards play a significant role in permit processing. Permits must also reflect certain monitoring requirements, and the EPA may require a source to install such devices.

As part of a consent agreement following a suit by NRDC, the EPA has also established limits for "toxic" pollutants.[3] These standards are to provide for "ample safety" and can prohibit the discharge of a toxic pollutant altogether. Several pesticides, benzidene, and polychlorinated biphenyls were subsequently designated as toxic pollutants, and standards were established regarding their discharge. In 1976, Congress enacted the Toxic Substances Control Act,[1] thereby placing greater emphasis on the control of such substances and greatly expanding EPA's responsibility for identifying and controlling them.

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[1] Rosenbaum, Walter A. The Politics of Environmental Concern, 2nd ed. New York, N.Y.: Praeger, 1977, pp. 157-59.

[2] Parenteau, Patrick A., and Nancy Tauman. "The Effluent Limitations Controversy: Will Careless Draftsmanship Foil the Objectives of the Federal Water Pollution Control Act Amendments of 1972?" Ecology Law Quarterly, Vol. 6 (No. 1, 1976), pp. 1-62.

[3] Environmental Reporter Decisions, June 26, 1976, p. 2120.

The federal government's water quality program also deals with "nonpoint sources," such as those that result in "runoff, seepage, and percolation of pollutants to surface and groundwaters through diffuse and undefined routes."[2] Examples of nonpoint sources are irrigated and nonirrigated farming, mining, urban runoff, and rural sanitation. The FWPCA establishes procedures under which state or regional agencies are required to establish nonpoint source regulatory programs.

2.9.2 Indian Controls

Indian tribes are required to comply with federal water pollution standards since all EPA statutes are of general applicability, and these statutes generally authorize the EPA to establish environmental standards applicable to Indian lands. For example, the NPDES permit requirements of the FWPCA apply to Indian lands. In general, state programs and implementing statutes do not apply to Indian lands unless the enabling statute explicitly confers jurisdiction over Indians to the state. The EPA does not interpret its enabling legislation as conferring implementation and enforcement authority over Indians to the states; however, there is considerable debate on this question. One EPA official summarized the agency's position on this point as follows:

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[1] Toxic Substances Control Act of 1976, Pub. L. 94-469, 90 Stat. 2003.

[2] U.S., Environmental Protection Agency. Clean Water: Report to Congress--1974. Washington, D.C.: Environmental Protection Agency, 1974, p. 14.

> Where there is a dispute over conflicting Tribal-State jurisdiction, EPA will not attempt to alter or define the present legal relationship. Thus, where States have not assumed jurisdiction over the reservations, EPA will accept, within the constraints of EPA statutes, the proposals by Indian governing bodies of their own pollution standards.[1]

2.9.3 State Controls

Under the terms of the 1965 Water Quality Act[2] and the 1970 Water Quality Improvement Act,[3] the states had been encouraged to develop water quality standards. When the states demonstrated a reluctance or inability to establish and enforce such regulations, the 1972 FWPCA Amendments[4] mandated federal water quality controls. Under the provisions of the FWPCA, states are permitted to promulgate antipollution standards, provided that these standards are consistent with or more stringent than federal standards. Thus, the current status of state water quality controls is as follows: the states' old

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[1] Will, J. Kemper. Questions and Answers on EPA's Authority Regarding Indian Tribes. Denver, Colo.: U.S., Environmental Protections Agency, Region VIII, 1976.

[2] Water Quality Act of 1965, Pub. L. 89-234, 79 Stat. 903.

[3] Water Quality Improvement Act, Pub. L. 91-224, 84 Stat. 91 (1970).

[4] Federal Water Pollution Control Act Amendments of 1972, Pub. L. 92-500, 86 Stat. 816.

(1965-1970) water quality standards are subject to change by the state governments, with each change subject to EPA approval; the state may lower ambient standards to reflect higher water quality, thus requiring EPA to change the effluent discharge limitations, since the FWPCA specifically requires the EPA to enforce state laws that are more stringent than federal standards. Further, the FWPCA requires the states to identify various water bodies and to specify the beneficial use that can be made of each body (industrial, recreational, etc.). Then the states must submit to EPA ambient water quality standards which would sustain these specific uses.

EPA guidelines list four essential requirements which must be met by the states to gain approval of state permit programs: a state statute prohibiting the discharge of pollutants except as authorized by permit; the permit issued under a state program must require compliance with all effluent limitations; the state must have adequate monitoring provisions and a right of entry to inspect; and the state must adopt adequate enforcement provisions. It should be noted that the states are not required to establish such a permit program, but if the state chooses not to adopt its own permit procedures, it forfeits enforcement authority to the federal government.

Currently four states in the eight state western region have an approved state permit program: Colorado, North Dakota, Montana, and Wyoming. Three other states--Arizona, Utah, and South Dakota--are currently in the process of attempting to gain federal approval of their state program. New Mexico is no longer actively seeking such approval. The penalties outlined in the existing state statutes are identical to those promulgated in the FWPCA. In effect, there is very little procedural or statutory difference in state or federal control of permit programs, although uncertainties remain regarding the enforcement of these standards.

As of yet, the EPA has published only a few guidelines for effluent standards for specific technologies. Therefore, in the interim, many state water quality standards continue to apply. In the West, there is a substantial variation among water quality standards both within states (according to use) and among the eight states for the various pollutants. Tables 2-34 through 2-44 outline the range of state water quality standards for dissolved oxygen, nitrates, phosphates, acidity, temperature, heavy metals, mercury, turbidity, settleable solids, oil, bacteria, and radioactivity. Table 2-45 then outlines the state classification systems for water use.

2.10 WATER USE

Although the quality and quantity aspects of water policy are closely related, the legal and institutional frameworks for each have developed independently at the federal level. Concern for water quality, as discussed in the previous section, has been a much more recent phenomenon than the need to develop mechanisms for controlling water use (quantity). The legal underpinnings for water use regulation date back to English common law traditions, while water quality standards are the result of the environmental movement of the last decade.

Obtaining water for energy activities is problematical in the arid West, where considerable uncertainty exists regarding the amount of water in the region not already allocated. Some experts argue that there is simply insufficient water to support extensive energy development in the region, while others maintain

TABLE 2-34. STATE WATER QUALITY STANDARDS FOR DISSOLVED OXYGEN

State	Standards (Milligrams Per Liter)		
	Cold Water Fishery	Warm Water Fishery	Miscellaneous
Arizona	6	6	
Colorado	6	5	PWS=4; IND=3
Montana	7[a]	5[b]	
New Mexico	6	5	
North Dakota	5		
Utah	6	5.5	PWS=5[c]
Wyoming	6	6	

PWS = Public Water Supply IND = Industrial

[a] Figure is for Class D-1. Class D-2 standard is 6 milligrams per liter.

[b] Figure is for Class D-3.

[c] Not more than 5 milligrams per liter 20 percent of the time. Alternate standard is 10 milligrams per liter 10 percent of the time.

TABLE 2-35. STATE WATER QUALITY STANDARDS FOR NITRATES

State	Standard
Arizona	All water of the state shall be free from materials attributable to domestic or industrial wastes...in amounts sufficient to taste or odor in water or detectable off-flavor in the flesh of fish... or in amounts sufficient to interfere with any beneficial use of the water.
Colorado	No specific criteria, but the narrative statement concerning toxic materials may restrict nitrates at levels below the occurrence of damage to aquatic life.
Montana	Class A (Closed)--None allowed in addition to concentrations naturally present. Class A (Open)--1962 USPHS standards and no induced variation beyond 10 percent of receiving water. Class B--No excess nutrients which cause nuisance aquatic growth. Concentrations should conform to USPHS standards after treatment. Class C--Concentrations shall be below levels known to be of public health significance. No excess nutrients which cause nuisance aquatic growth. Class D1--Maximum allowable concentrations shall be less than acute problem levels as revealed by bioassay. No excess nutrients which cause nuisance aquatic growth. Class D2, D3--same as D1. Class E--Concentrations to be less than those demonstrated to be deleterious to livestock, plants or their subsequent consumption by humans.
New Mexico	General statement limits organics in receiving waters to concentrations which will not change the ecology of receiving waters to an extent detrimental to existing forms of life or which are toxic to human, plant, fish and animal life.
North Dakota	The standard for nitrates is intended as a guideline since each water body has unique characteristics. Basic standard--1.0 mg/ℓ. However, in no case shall the standard for nitrates exceed this level for any waters used as a municipal or domestic drinking supply.
Utah	No specific statement, other than general restriction making it unlawful to discharge substances in such a way to interfere with the stated water use.
Wyoming	No specific criteria or general statement that could be applied to nitrates.

USPHS = U.S. Public Health Service mg/ℓ = milligrams per liter

TABLE 2-36. STATE WATER QUALITY STANDARDS FOR PHOSPHATES

State	Standard
Arizona	All waters of the state shall be free from materials attributable to domestic or industrial wastes... (same as statement for nitrates, see Table 2-35).
Colorado	No specific criteria (see Table 2-35).
Montana	No excess nutrients which cause nuisance aquatic growth.
New Mexico	No specific criteria or narrative statement.
North Dakota	The standard for phosphates (1.0 mg/ℓ) is intended as a guideline limit, since each stream or lake has unique characteristics.
Utah	No specific statement or criteria other than a general statement making it unlawful to discharge substances in such a way to interfere with the stated water use.
Wyoming	No specific criteria or narrative statement.

mg/ℓ = milligrams per liter

TABLE 2-37. STATE WATER QUALITY STANDARDS FOR ACIDITY/ALKALINITY (pH)

State	Standard (Milligrams Per Liter)	
Arizona	6.5-8.6	
Colorado	Public Water Supply	6.0-9.0
	Fish and Wildlife	6.5-8.5
	Industrial	5.0-9.0
Montana	Class A (Closed)	none
	Class A (Open)	6.5-8.5
	Class B	6.5-9.5
	Class C	6.5-9.5
	Class D-1	6.5-8.5
	Class D-2	6.0-9.0
	Class D-3	6.5-9.5
	Class E	6.5-9.5
	Class F	6.5-9.5
New Mexico	6.6-8.6	
North Dakota	6.0-9.0 or 7.0-8.5, depending on the specific river listed	
Utah	6.5-8.5 maximum variation ± 0.5, but industrial use 6.5-9.0	
Wyoming	6.5-8.5 for streams where water quality data is inadequate and some specified rivers have more stringent standards	

TABLE 2-38. STATE WATER QUALITY STANDARDS FOR TEMPERATURE

State	Standard
Arizona	93 degree maximum, not more than 5 degrees F change. Cold water fish: November-March--55 degrees F maximum; April-October--70 degrees F maximum with not more than 2 degrees F change.
Colorado	Class B1 (cold water fish)--70 degrees maximum. No controllable temperature change will be permitted which will interfere with the spawning and other aspects of fish life. Abrupt changes in temperature must be avoided and the normal pattern of diurnal and seasonal fluctuations must be preserved. The maximum allowable rise in temperature resulting from waste discharges in streams or lakes shall be 2 degree F. No warming discharge permitted in lakes. Class B2 (warm water fish)--90 degrees F maximum. No controllable temperature change will be permitted which will interfere with spawning and other aspects of fish life. Abrupt changes in temperature must be avoided and the normal pattern of diurnal and seasonal fluctuations must be preserved. The maximum allowable temperature increase due to waste discharge in streams will be 5 degrees F, and the maximum increase allowable from waste discharges in lakes is 3 degrees F. No warming discharges to lakes. Class B1 and B2--in temperature measurement, allowance shall be made for a mixing zone. Provisions shall be made for adequate mixing and free movement of aquatic biota shall be permitted in any waters of the state. Class C--(industrial)--the temperature shall not exceed 93 degrees F. Class D--(irrigation)--no temperature criteria assigned.
Montana	Public Water Supply--no allowable change to naturally occurring water temperature. Salmonid fish--increases: 32 degrees F to 67 degrees F--2 degrees F maximum. Classes D1 and D2--above 67 degrees F--0.5 degrees F maximum; decreases--over 55 degrees F--2 degrees F maximum per hour; 55 degrees F to 32 degrees F--2 degrees F maximum, provided that water temperature must be below 40 degrees F in the winter and above 44 degrees F in the summer. Nonsalmonid fish--(Class D3)--increase--32 degrees F to 85 degrees F--4 degrees F maximum; 85 degrees F--0.5 degrees F maximum; decreases--same as Salmonid fish. Industrial--no allowable temperature change in sufficient quantities to adversely affect the use indicated.

(continued)

TABLE 2-38. STATE WATER QUALITY STANDARDS FOR TEMPERATURE (continued)

State	Standard
North Dakota	85 degrees F maximum, allowable rise 5 degrees F above natural.
New Mexico	Warm water fish--93 degrees F maximum, 5 degrees F change limit. Cold water fish--70 degrees F maximum, 2 degrees F change limit. Allowable rise of 9 degrees F for the lower reach of the Pecos River.
Utah	Cold water fish--68 degrees F maximum, 2 degrees F change limit. Warm water fish--80 degrees F maximum, 4 degrees F change limit.
Wyoming	For streams where natural temperatures do not exceed 70 degrees F, wastes of other than natural origin shall not be discharged in amounts which will result in an increase of more than 2 degrees F over existing temperatures. For streams where natural temperatures exceed 70 degrees F, wastes of other than natural origin shall not be discharged in amounts which will result in an increase of more than 4 degrees F over existing temperatures. Maximum allowable temperatures will be established for individual streams as data becomes available. As an interim policy, the maximum allowable stream temperatures will be the maximum daily stream temperatures plus the allowable rise; provided that this temperature is not lethal to existing fish life, which is considered to be 78 degrees F in the case of cold water fish.

F = Fahrenheit

TABLE 2-39. STATE WATER QUALITY STANDARDS FOR HEAVY METALS AND MERCURY

Pollutant[a]	State						
	Arizona[b]	Colorado	Montana[c]	New Mexico[c]	North Dakota[d]	Utah	Wyoming[c]
Arsenic	0.05				0.05	0.05	
Barium	1.00				1.00		
Boron					0.50	1.00	
Cadmium	0.01	0.01			0.01	0.01	
Chromium[e]	0.05	0.05			0.05	0.05	
Copper	1.00				0.05		
Mercury	0.005				0.002		
Lead	0.05	0.05			0.05	0.05	
Silver	0.05	0.05					
Zinc	5.00	0.05			1.00	5.00	
Cyanide	0.20				0.005	0.20	
Phenol	.001				0.01	0.001	
Selenium	.01				0.01	0.01	

[a] All numbers are in milligrams per liter.

[b] Class A only.

[c] Unknown.

[d] Class I and IA areas only.

[e] Chromium with +6 valence.

TABLE 2-40. STATE WATER QUALITY STANDARDS FOR TURBIDITY

State	Standard
Arizona	Discharges into receiving bodies of water should not cause the turbidity to exceed: warm water streams--50 Jackson Units; cold water streams--10 Jackson Units; warm water lakes--25 Jackson Units; cold water lakes--10 Jackson Units.
Colorado	No turbidity shall exist in concentrations that will impair natural and developed fisheries.
Montana	Class A (Closed)--None allowed. Class A (Open)--None allowed. Classes B, F--None in sufficient quantities to affect treatment. Classes C, D2, D3--10 Jackson Units. Class D1--5 Jackson Units. Class E--None in sufficient quantities to affect use.
North Dakota	A general statement limits unspecified substances to concentrations that interfere with intended use.
New Mexico	Turbidity of receiving water shall not reduce light transmission to the point that existing aquatic life in that section of the stream is inhibited.
Utah	It shall be unlawful to discharge or place any waste...in such a way as to result in substances producing objectional...turbidity.
Wyoming	Where turbidity of receiving waters is 150 turbidity units or less the maximum increase is 15 units; and where turbidity is over 150 units the maximum increase is 10 percent.

TABLE 2-41. STATE WATER QUALITY STANDARDS FOR SETTLEABLE SOLIDS

State	Standard
Arizona	Discharges should be free from substances that will settle to form deposits in amounts sufficient to be unsightly or interfere with beneficial use of the water.
Colorado	Discharges should be free from substances that will settle to form deposits in amounts sufficient to be unsightly or interfere with classified use of the water.
Montana	Class A (Closed)--None allowed. Class A (Open)--None in sufficient quantities to adversely affect the use intended. Class B--None in sufficient quantities to adversely affect the levels of treatment. Classes C, D1, D2, D3, E and F--Same as Class A (Open).
North Dakota	Discharges should be free from substances that will settle to form deposits in amounts sufficient to interfere with intended use of the water.
New Mexico	The stream bottom shall be free from sediment that will adversely inhibit the growth of stream flora or fauna or significantly alter the physical or chemical properties of the bottom.
Utah	It shall be unlawful to discharge substances in such a way to result in materials that will settle to form objectionable deposits.
Wyoming	All water of the state shall be essentially free from substances (other than natural) that will settle to form sludge, bank or bottom deposits.

TABLE 2-42. STATE WATER QUALITY STANDARDS FOR OIL

State	Standard
Arizona	Free from oil or grease in amounts to be unsightly or in amounts sufficient to interfere with classified use of water.
Colorado	Free from oil or grease attributable to controllable sources.
Montana	Class A (Closed)--None. Class A (Open)--None in sufficient quantities to affect use. Class B--None in sufficient quantities to affect treatment. Classes C, D, E, and F--Same as Class A (Open).
North Dakota	No discharges that result in oil slicks that will be unsightly or have a deleterious effect on water usage.
New Mexico	Receiving waters shall be free from oil or grease where these materials come from other than natural sources.
Utah	It shall be unlawful to discharge wastes in such a way as to result in floating debris, oil, scum, and other matter.
Wyoming	Essentially free from floating debris, oil, grease, scum, and other floating materials of other than natural origin in amounts sufficent to be unsightly.

TABLE 2-43. STATE WATER QUALITY STANDARDS FOR BACTERIA LEVELS

State	Classes or Uses	Maximum Bacteria Level (per mℓ)
Arizona	A	Geometric mean of 1,000/100 mℓ for fecal coliform nor more than 10 percent of samples to exceed 2,000/100 mℓ.
	B (primary body contact)	Geometric mean of 200/100 mℓ for fecal coliform nor more than 10 percent of samples to exceed 400/100 mℓ.
	C	Same as Classes A and B above.
Colorado	A, B1, B2	Log mean of 1,000/100 mℓ for fecal coliform nor more than 10 percent of samples to exceed 2,000/100 mℓ.
	B3	Monthly average of 1,000/100 mℓ total coliform nor more than 20 percent of samples over the 1,000/100 mℓ and no samples over 2,400/100 mℓ. Also monthly average of 100/100 mℓ fecal coliforms and 20/100 mℓ fecal streptococcus; where these are determined as an average of five samples per month.
Montana	A (after disinfection)	Average total coliforms less than 50/100 mℓ.
	A (after disinfection and removal of natural impurities)	Average total coliforms less than 50/100 mℓ as a result of domestic sewage.
	All remaining uses (after treatment)	Average total coliform less than 1,000/100 mℓ where demonstrated as part of domestic sewage nor more than 20 percent of samples to exceed the 1,000/100 mℓ.
North Dakota	Criteria assigned by river use	Not to exceed 200/100 mℓ consecutive 30-day geometric mean or 400/100 mℓ 7-day geometric mean.
New Mexico	Criteria assigned by river use	Varies from 100/100 mℓ to 1,000/100 mℓ total coliforms using a monthly average.
Utah	A (without treatment)	Based upon USPHS Drinking Water Standards.
	B (after disinfection)	Monthly arithmetic mean not to exceed the 50/100 mℓ, nor more than 20 percent to exceed the 50/100 mℓ. nor more than 5 percent to exceed 100/100 mℓ.
	C (after treatment)	Monthly arithmetic mean of 5,000/100 mℓ total coliforms, but 20 percent can exceed the 5,000/100 mℓ if no more than 5 percent over 20,000/100 mℓ and the monthly arithmetic mean of total coliforms is not over 2,000/100 mℓ.
	CR	Monthly arithmetic mean of total coliforms of 1,000/100 mℓ nor more than 20 percent over 1,000/100 mℓ, nor more than 5 percent over 4,000/100 mℓ, and monthly arithmetic mean for fecal coliforms not over 200/100 mℓ, nor more than 10 percent over 400/100 mℓ monthly arithmetic mean for coliforms not over 5,000/100 mℓ but 20 percent may be over 5,000/100 mℓ if no more than 5 percent over 20,000/100 mℓ.
Wyoming	May 1-September 30 limited body contact (some criteria also assigned by river basin)	Fecal coliforms not over 95 percent confidence of historical, and in no case is the geometric mean of last five samples to exceed 2,000/100 mℓ.

mℓ = milliliters

USPHS = U.S. Public Health Service

TABLE 2-44. STATE WATER QUALITY STANDARDS FOR RADIOACTIVITY

State	Standard
Arizona	The concentration of radioactivity in surface waters of the state shall not (a) exceed 1/30 of the MPC values given for continuous occupational exposure in National Bureau of Standards Handbook Number 69; (b) exceed the USPHS Drinking Water standards for water used for domestic supplies; (c) result in the accumulation of radioactivity in edible plants or animals that present a hazard to consumers; and (d) be harmful to aquatic life.
Colorado	Radioactive materials attributable to municipal, industrial or other controllable sources will be minimum concentrations that are physically and economically feasible to achieve. In no case shall such materials in the stream exceed the limits established in the current edition of the USPHS Drinking Water Standards or the limits approved by the FRC, or, in the absence of any limits specified by the USPHS or the FRC, 1/30 of the 168-hour-week values for other radioactive substances specified in the National Bureau of Standards Handbook Number 69.
Montana	Class A (Closed)--no wastes shall be allowed which increase radioactivity above natural background. Class A (Open), B--USPHS Drinking Water Standards. Classes C, D1, D2, D3--same as A (Open)-B-C except where concentration factors of aquatic flora and fauna exceed the recommended reduction factors, then maximum permissible limits shall be reduced below acute or chronic problem areas. Classes E, F--same as A (Open).
North Dakota	The average dissolved concentrations (including the naturally-occurring or "background" contribution) of iodine-131, radium-226, strontium-89, strontium-90, and tritium shall not exceed the following limits: iodine-131-5 pCi/ℓ; radium-226--1 pCi/ℓ; strontium-89--100 pCi/ℓ; strontium-90--10 pCi/ℓ; and tritium--3,000 pCi/ℓ. For all other radionuclides, the average concentration limits shall be 1/150 of the corresponding maximum permissable concentration as recommended by the National Committee on Radiation Protection.
New Mexico	The concentrations of radioactivity will be maintained at the lowest practical level. Radionuclides shall not be present in receiving waters in concentrations that are inimical to aquatic life or that will, after conventional drinking water treatment, prevent meeting the USPHS 1962 Drinking Water Standards or be greater than 1/30 of the 168-hour value for other radioactive substances specified in the National Bureau of Standards Handbook Number 69.
Utah	USPHS 1962 Drinking Water Standards apply. Also, radioactive substances shall not exceed 1/30 of the MPC values specified in the National Bureau of Standards Handbook Number 69 or result in accumulation of radioactivity in edible plants and animals that present a hazard to consumers.
Wyoming	Radioactive materials of other than natural origin shall not be present in any amount which reflects failure in any case to apply all controls which are physically and economically feasible. In no case will such materials exceed the limits established in the 1962 PHS Drinking Water Standards or 1/30 (168-hour value) of the values for radioactive substances specified in the National Bureau of Standards Handbook.

MPC = maximum permissible concentration
FRC = Federal Radiation Council
USPHS = U.S. Public Health Service
pCi/ℓ = picocurries per liter

TABLE 2-45. STREAM USE CLASSIFICATIONS DESIGNATED IN STATE WATER QUALITY LAWS

State	Classifications
Arizona	Class A--Domestic and Industrial Supply Class B--Recreation Class C--Fish and Wildlife Class D--Agriculture
Colorado	Class A--Potable Water Supply Class B1--Fish and Wildlife--cool water fishery Class B2--Fish and Wildlife--warm water fishery Class B3--Recreation waters and body contact sports, such as, but not limited to, swimming and water skiing Class C--Industrial Use Class D--Irrigation
Montana	Class A--Closed--Water supply for drinking, culinary, and food processing purposes, suitable for use after simple disinfection Class A--Open--B1--Water supply for drinking, culinary and food processing purposes, suitable for use after simple disinfection and removal of naturally present impurities. Water quality shall also be maintained suitable for the use of these waters for bathing, swimming and recreation Class B--B1--Suitable for drinking, culinary and food processing purposes after adequate treatment equal to coagulation, sedimentation, filtration, disinfection, and any additional treatment necessary to remove naturally present impurities; bathing swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, water fowl and furbearers; agricultural and industrial water supply.

(continued)

TABLE 2-45. STREAM USE CLASSIFICATIONS DESIGNATED IN STATE WATER QUALITY LAWS (continued)

State	Classifications
	Class B--B2--The quality of these waters shall be maintained suitable for the uses described for B--Bl, except that the fisheries shall be described as follows: growth and marginal propagation of salmonid fishes and associated aquatic life, water fowl and furbearers.
	Class B--B3--Suitable for the uses described for B--Bl waters except that the fisheries shall be described as follows: growth and propagation of nonsalmonid fishes and associated aquatic life, water fowl, and furbearers.
	Class C--D2--Suitable for bathing, swimming, and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, water fowl, and furbearers; agricultural and industrial water supply.
	Class D2--Growth and marginal propagation of salmonid fishes and associated aquatic life, water fowl, and furbearers; agricultural and industrial water supply.
	Class E--Agricultural and industrial water supply uses.
	Class F--Suitable for industrial water supply uses, other than food processing.
New Mexico	Class 1--Recreation
	Class 2--Irrigation
	Class 3--Fish and Wildlife Propagations
	Class 4--Industrial Water Supply
	Class 5--Municipal Water Supply
	Class 6--Trout Waters
North Dakota	Class 1--Municipal
	Class 2--Industrial
	Class 3--Recreational
	Class 4--Agricultural
	Class 5--Waste Treatment

(continued)

TABLE 2-45. STREAM USE CLASSIFICATIONS DESIGNATED IN STATE WATER QUALITY LAWS (continued)

State	Classification
Utah	Class A--Shall be so protected against controllable pollution, including heat, as to be suitable at all times without treatment for domestic water supplies, irrigations, stock watering, fish and wildlife propagation, recreation, as a source of industrial supplies and for other uses as may be determined by the boards.
	Class B--Shall be so protected against controllable pollution, including heat, as to be suitable at all times for domestic water supplies which are treated before use by disinfection only. Class B waters shall be suitable without treatment for irrigation, stock watering, fish and wildlife propagation, recreation, as a source of industrial supplies, and for other uses as may be determined by the boards.
	Class C--Shall be suitable at all times for domestic water supplies which are treated before use by coagulation, sedimentation, filtration, and disinfection. Class C waters shall be suitable without treatment for aesthetics, irrigation, stock watering, propagation and perpetuation of fish, other aquatic wildlife life, and recreation (except swimming), as a source of industrial supplies and for other uses as may be determined by the boards.
	Class D--Suitable for limited irrigation, not including the irrigation of lawns, recreational areas, pastures used for dairy cattle, root crops, or any low growing crops produced for human consumption. Class D waters shall be suitable as a source for industrial supplies and for other uses as may be determined by the boards.
	Class E--Uses shall be limited to those determined by the boards.

(continued)

TABLE 2-45. STREAM USE CLASSIFICATIONS DESIGNATED IN STATE WATER QUALITY LAWS (continued)

State	Classifications
Wyoming	Class 1--Municipal Water Supply Class 2--Fish and Wildlife Propagation Class 3--Agricultural Class 4--Industrial Class 5--Whole Body Contact Recreation Class 6--Limited Body Contact Recreation Class 7--Aesthetics Class 8--Waste Assimilation

that the real issue involves only the priorities attached to energy development versus alternate uses such as agricultural production.

2.10.1 Federal Controls

2.10.1.1 Legal Framework

Four legal doctrines provide the foundation for modern water use laws: the "riparian," the "appropriation," the "federal reserved," and the "Indian reserved" doctrines.

The riparian doctrine is based in the common law notion of "adjoining" rights. This doctrine, which is the basis of water law in most eastern states, entitles a landowner to a "reasonable" use of water as it passes through his property.[1]

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[1] Jensen, Dallin W. "Some Legal Aspects of Water Resources Management." Public Administration Review, Vol. 37 (September/October 1977), p. 458.

In the West, however, the scarcity of water resource forced the abandonment of riparian standards and the adoption of the appropriation doctrine in its place. In this framework, water is apportioned among users according to who was first to put water to a "beneficial" use. Beneficial use is defined by statute, and water used otherwise may revert back to other users whose application is beneficial. This system guarantees the first user (among competing users from the same source) a continuing water right. In other words, "the first in time is first in right." Secondary (newer) users were then aware of the priority established for early appropriators.

Although the appropriation at first depended almost entirely on the courts to settle disputes, the modern legal framework has evolved into a comprehensive statutory scheme which encompasses regulatory procedures as well. The current approach includes three basic steps: appropriation, distribution, and adjudication (discussed below).

Both the riparian and appropriation doctrines originated with the states, but both have been incorporated into the federal legal framework through the federal reserved doctrine. As early as 1899, the courts had held that the federal government implicitly reserved sufficient water each time it set aside a parcel of land from the public domain for a federal purpose. More recent decisions have broadened the scope of this doctrine by holding that: the priority date relates back to the date the land was set aside; in contrast to the appropriation system, the reserved water right is not lost due to nonuse; and the federal right is not subject to state laws regulating appropriation.[1]

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[1] Harris, Richard W., William D. Jeffery, and Blair W. Stewart, Jr. Interstate Environmental Problems. Stanford, Calif.: Stanford Environmental Law Society, 1975, p. 51.

The water rights of Indians have been guaranteed by a similar doctrine.

While the courts have played a major role in delineating the general federal water use approach, a number of statutes have been significant in establishing the federal legal framework. These statutes have been of two broad types: water quality controls, and arid land reclamation and conservation regulations. Water quality controls, discussed in the previous section, indirectly influence water use through the introduction of the EPA into EIS evaluations (under NEPA[1]) and water pollution regulation (under FWPCA[2]). Arid land reclamation and conservation legislation has a longer history: the 1902 Reclamation Act,[3] which charged the DOI, and specifically the Bureau of Reclamation, with making western lands available for agricultural development, is the earliest example of such laws. In 1920, the Federal Water Power Act[4] gave the Federal Power Commission (FPC) authority over the construction and operation of hydroelectric facilities, and the Water Resources Planning Act of 1965[5] encouraged the conservation and development of water resources through the creation of the water Resources Council (WRC).

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[1] National Environmental Policy Act of 1969, Pub. L. 91-190, 83 Stat. 852.

[2] Federal Water Pollution Control Act Amendments of 1972, Pub. L. 92-500, 86 Stat. 816.

[3] Reclamation Act, Pub. L. 57-161, 32 Stat. 388 (1902).

[4] Federal Water Power Act, Pub. L. 66-280, 41 Stat. 1063 (1920).

[5] Water Resource Planning Act of 1965, Pub. L. 89-80, 79 Stat. 244.

Another significant method of controlling national water use has been the "interstate compact." The compact is a negotiated agreement, ratified by each of the participating states and the Congress, which allocates water according to specific regional needs and interests. Of the many interstate compacts negotiated over the years, the most important for water use in the West have been the Colorado River Compact of 1922,[1] the Upper Colorado River Basin Compact of 1938,[2] the Boulder Canyon Project Act of 1948,[3] and the Colorado River Basin Project Act of 1968.[4] As shown in Table 2-46, each of these agreements provide for a percentage allocation of available water resources for participating states.

Finally, the federal legal framework for water use control has been modified by several international treaties. The most important international agreement for water use in the West has been the specification of U.S. and Mexican obligations with respect to the waters of the Colorado River (in 1944[5] and modified in 1973[6]).

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[1] Colorado River Compact of 1922, 42 Stat. 171, 45 Stat. 1064, declared effective by Presidential Proclamation, 46 Stat. 3000 (1928).

[2] Upper Colorado River Basin Compact of 1948, Pub. L. 81-37, 63 Stat. 31 (1949).

[3] Boulder Canyon Project Act, Pub. L. 70-642, 45 Stat. 1057 (1928).

[4] Colorado River Basin Project Act, Pub. L. 90-537, 82 Stat. 885 (1968).

[5] Treaty between the United States of America and Mexico Respecting Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande, February 3, 1944, 59 Stat. 1219 (1945), Treaty Series No. 994.

[6] Minute No. 241, Department of State Bulletin, Vol. 67 (1972), p. 198.

TABLE 2-46. INTERSTATE COMPACTS AND AGREEMENTS

Compact or Arrangement	Lower Colorado River Basin			Upper Colorado River Basin				Upper Missouri River Basin		
	Arizona	California	Nevada	Colorado	New Mexico	Utah	Wyoming[a]	Montana	North Dakota	South Dakota
Colorado River Compact, 1922	Guarantees 7.5 MAFY to the Lower Basin									
Boulder Canyon Project Act, 1928, and Arizona versus California, 1963[b]	2.8 MAFY	4.4 MAFY	0.3 MAFY							
Upper Colorado River Basin Compact, 1948	.05 MAFY			51.75% of flow remaining after Lower Basin and Arizona Shares	11.25% of remainder	23% of remainder	14% of remainder			
Yellowstone Compact, 1950[c]										
Clark's Fork River							60%	40%		
Big Horn River							80%	20%		
Tongue River							40%	60%		
Powder River							42%	58%		
Bell Fourche River Compact, 1944[d]							10%			90%

MAFY = million acre-feet per year

[a] Surface waters in Wyoming are part of both the Upper Colorado River Basin and the Upper Missouri River Basin.

[b] Note: In Arizona v. California, the U.S. Supreme Court held that the compact-apportioned water available to the Lower Basin states was divided among them as follows: California, 4.4 MAFY; Arizona, 2.8 MAFY; and Nevada, 0.3 MAFY. Although the division was not agreed to by the states, the terms of the division were finalized by the Supreme Court's decree.

[c] The compact recognized existing appropriations for beneficial uses and divided the remaining waters as shown.

[d] Recognizes existing water right priorities of South Dakota and Wyoming. Remaining unappropriated water allocated as shown.

2.10.1.2 Administrative Authority

The administrative setting for water-use management at the federal level is fragmented. Authority is dispersed among the "old-line construction agencies" such as DOD's COE, DOI's Bureau of Reclamation and USDA's Soil Conservation Service and the newer "environmental agencies" such as the EPA and DOI's Fish and Wildlife Service. In addition, power production agencies such as FERC in the DOE and quasi-administrative bodies such as the WRC play an important role in controlling water use at the national level.

The COE, by reason of its nationwide field of operations, its powerful constituencies, and its size and budget, is "clearly the dominant agency in water resources construction."[1] The Corps' main responsibility in water resource management is the construction of large downstream flood control and navigation projects. The Bureau of Reclamation has a much narrower mission--it is limited to the western states and to the regulation of the construction and operation of hydroelectric generation facilities, irrigation networks, and drainage systems. The Soil Conservation Service is primarily involved in agricultural flood control projects.

The EPA has both a regulatory and a distributive function in water-use management. As a part of its Congressional mandate, EPA is charged with developing and implementing standards to meet the national goal of clean water by 1985. In addition, the agency is responsible for distributing federal subsidies to states and municipalities for improving and constructing waste treatment facilities to meet water quality criteria.

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[1] Ingram, Helen, and J.R. McCain. "Federal Water Resources Management: The Administrative Setting." Public Administration Review, Vol. 37 (September/October 1977), p. 449.

The Fish and Wildlife Service's participation in water resources decisionmaking has emphasized the maintenance of an environment favorable for fish and wildlife. Often this has placed the Service in opposition to projects proposed by the Bureau of Reclamation or the COE.[1]

Secondary roles in water-use control are played by FERC, which must approve the construction of hydroelectric facilities, and the WRC, which coordinates water policy with other federal agencies and administers grants to state water-use programs. And those federal agencies with control over watershed lands--the Forest Service, the BLM, the National Park Service, and the Defense Department--may also influence water use through their own land-use policies.

2.10.1.3 Regulatory Provisions

Water-use projects, whether undertaken by the Bureau of Reclamation, the COE or the Soil Conservation Service, have certain regulatory provisions in common. In most instances:

> Federal agencies have generally followed guidelines of fairness and equity in selecting projects for authorization and funding. These guidelines are essential because the great number of localities which do not receive a project (and their representatives) must be convinced that expenditures are justifiable and that

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[1] Doerksen, Harvey. "Water, Politics, and Ideology: An Overview of Water Resources Management." Public Administration Review, Vol. 37 (September/October 1977), p. 446.

> a worthy project in their area will have an open opportunity for authorization and funding in the future. Therefore, federal agencies apply routine tests of physical and economic feasibility to project proposals. The most important test has long been the benefit-cost ratio, which gives agencies a reasonably flexible but professionally respectable means for turning down projects which might bring discredit to a program.[1]

Following this extensive selection and evaluation process (which may involve multiple feasibility studies and may take several years to complete), there may be a need to acquire water rights (from either public or private owners). Then Congressional authorization of funding must be sought. If funding is authorized, a private contractor builds the water facility.

Typically water projects grow to include a variety of related proposals. What began as an irrigation project, for example, may incrementally add municipal or industrial water supply, electric power generation, recreation, flood control, fish and wildlife propagation, and water quality features. These additional components serve not only to legitimize the project to the general public, but also reduce the competition and conflict among the range of water-use control agencies.

2.10.2 Indian Controls

Under the reservation doctrine, Indians have water rights reserved as of the date their reservation was established. Most of the Indian reservations in the West were established very early as compared to most present holders of appropriation rights to western water. The application of this doctrine has produced persistent conflicts which are argued in the courts, and although numerous decisions have been made, none have unambiguously quantified Indian water rights. Indian tribes defending or claiming water rights have to do so originally in state courts.[1] Many Indians believe that state courts are inherently more sympathetic to state interests, and that since federal courts are not generally inclined to review findings of fact from lower courts, the system is biased against their rights.

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[1] Ingram, Helen, and J.R. McCain. "Federal Water Resources Management: The Administrative Setting." Public Administration Review, Vol. 37 (September/October 1977), p. 450.

This ambiguity in Indian rights has restricted development by holders of more junior rights in some cases. However, to facilitate the development of water projects, Indians may enter into contracts with other parties in order to assure an adequate water supply for new facilities. In all such arrangements, the federal government continues to act in its role as trustee for the rights of Indians.[2]

2.10.3 State Controls

As noted above, the appropriation doctrine is the predominate method of water allocation in the West. All of the western states have now adopted institutional arrangements and administrative procedures based on the appropriation approach to water rights, although only six of the eight western states have what might be termed a "pure" appropriation system. Both North and South Dakota have adopted the "California Doctrine," which combines riparian and appropriation procedures.

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[1] This is based on the McCarren Amendment, as affirmed in U.S. v. District Court in and for County of Eagle, 401 U.S. 520 (1971) and U.S. v. District Court in and for Water Division No. 5, 401 U.S. 527 (1971).

[2] Wilkinson, Glen A. "Indian Control and Use of Water for Mineral Development," in Rocky Mountain Mineral Law Foundation, ed. Institute on Indian Land Development--Oil, Gas, Coal and Other Minerals. Tucson, Ariz.: Rocky Mountain Mineral Law Foundation, 1976, pp. 9-1 through 9-23.

Typically, the water-use controls of the western states feature mechanisms governing appropriation, distribution, and adjudication. The appropriation phase is usually overseen by a single water rights administrator, often designated the "state engineer," who receives applications, determines if there is unappropriated water which can be placed to "beneficial use," appropriates the water, and issues certificates of perfected water right. Distribution is accomplished by a centralized water administration, in most cases administered by a water commissioner who has the responsibility for regulating a stream and distributing water according to user priorities. Adjudication procedures vary from state to state, but virtually all the western states have adopted statutes which clearly define each user's right and which integrate these rights according to their priorities.[1]

In addition to these state water-use agencies, most western states have separate agencies responsible for developing water plans or overseeing development projects. And every state has public special purpose districts (for irrigation, etc.) which may influence water use policy. Finally, the western states have become more organized on a regional basis. Fear of federal preemption of state controls has led to the creation of such regional organizations as the Western States Water Council.

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[1] Jensen, Dallin W. "Some Legal Aspects of Water Resources Management." Public Administration Review, Vol. 37 (September/October 1977), pp. 457-58. See also Daneke, Gregory A. "Public Involvement in Natural Resource Development: A Review of Water Resource Planning." Environmental Affairs, Vol. 6 (1977), pp. 11-32.

2.11 SOLID WASTE DISPOSAL

While the primary concerns of the environmental movement to date have focused on the pollution of air and water, increasing attention has been given to the problems associated with solid waste disposal on land. The waste disposal problem for energy resource development activities range from the control of mine tailings through the handling of process residuals like ash and sludge to the regulation of radioactive materials.

2.11.1 Federal Controls

2.11.1.1 Legal Framework

Many of the federal laws for solid waste management are primarily directed at the maximization of air and water quality; federal controls on solid waste disposal itself are very limited. For example, the Rivers and Harbors Act[1] forbids landfills that may threaten navigation channels. Similarly, the leaching of landfills is regulated by the Water Pollution Control Amendments.[2] And, because solid waste dumps may threaten air quality, the Clean Air Act[3] requires the states to include solid waste disposal in their implementation plans.

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[1] Rivers and Harbors Act of 1899, 30 Stat. 1121.

[2] Federal Water Pollution Control Act Amendments of 1972, Pub. L. 92-500, 86 Stat. 816.

[3] Clean Air Act Amendments of 1970, Pub. L. 91-604, 84 Stat. 1676.

Federal controls on solid waste disposal are contained in three pieces of legislation: the 1965 Solid Waste Disposal Act,[1] and the 1970 Resource Recovery Act,[2] and the 1976 Resource Conservation and Recovery Act.[3] These statutes are primarily mechanisms for providing federal grants for state facility improvements or for conducting waste management research and development activities (although there are provisions in the 1976 act for federal controls on "hazardous" wastes).[4]

2.11.1.2 Administrative Authority

The EPA is charged with the limited federal responsibility in the area of solid waste management. As a part of the mandate of the Resource Recovery Act, the EPA established an Office of Solid Waste Management Programs which is involved in providing technical assistance in the development and operation of waste management activities. And, as a result of the passage of the Resource Conservation and Recovery Act,[5] the EPA has undertaken a broad research and development effort in solid waste management--projects include work on small-scale and low-technology systems (improved sludge management, etc.) in particular.

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[1] Solid Waste Disposal Act, Pub. L. 89-272, 79 Stat. 997 (1965).

[2] Resource Recovery Act of 1970, Pub. L. 91-512, 84 Stat. 1227.

[3] Resource Conservation and Recovery Act of 1976, Pub. L. 94-580, 90 Stat. 2795.

[4] See Clark, Wilson. Energy for Survival. New York, N.Y.: Anchor Books, 1974, pp. 98-102.

[5] Resource Conservation and Recovery Act.

Other agencies also have some administrative authority in this area. The NRC promulgates standards for the control, use and transfer of licensed radioactive materials in an effort to keep the combined total exposure below the federal protection standards. The MSHA develops regulations relating to the stability of refuse piles and water impoundments associated with coal mining activities.

In fact, however, neither the EPA nor MSHA have anything approaching comprehensive responsibility for controlling solid waste disposal. The governmental control problems associated with solid waste management are similar to those for facility siting and land use--the federal government has failed to fill a major policy vacuum. Typical of the lack of attention given to the problems of solid waste disposal is the National Energy Plan,[1] which specifies only air quality and strip mine reclamation as environmental protection devices. The issue of the wastes produced by those very control mechanisms is ignored by the Plan.[2]

2.11.1.3 Regulatory Provisions

Solid wastes are the major form of pollutant for which the federal government has not issued comprehensive standards. The existing regulations fall into three broad categories: reduction of air pollution and disease from waste disposal in incinerators, open dumps, etc.; reduction of water pollution from landfill leaching, channel blockage, or debris; and increasing the competitiveness of solid wastes as recycled materials. Currently, most of these federal rules are aimed at the control of municipal wastes.

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[1] U.S., Executive Office of the President, Energy Policy and Planning. The National Energy Plan. Washington, D.C.: Government Printing Office, 1977.

[2] See U.S., Congress, Office of Technology Assessment. Analysis of the National Energy Plan. Washington, D.C.: Government Printing Office, 1977, p. 218.

2.11.2 State Controls

Each of the western states has some control mechanism for solid waste disposal. All eight states mandate either "approval" of a waste disposal sites and its operations or a more formal "permit" procedure. Three western states (South Dakota, North Dakota, and Montana) have a permit system in which the site operator receives a permit from a state or local health board to operate within certain regulations. Along with the permit or approval procedure, the state usually prohibits the disposal of any waste outside the state.

Those states not having a permit system (Wyoming, New Mexico, Utah, Colorado, and Arizona) use approval procedures. In this arrangement, the state approves the location and operation of the disposal site. Here again, the state agency has set out certain minimum operating procedures to which the site operator must comply.

Most states in the West (all but Arizona and New Mexico) have some regulatory authority over the disposal of hazardous wastes. These range from the prohibition against disposal of radioactive wastes in Colorado and Utah to "owner held liable" rules in North Dakota. Montana is unique in requiring a special permit for hazardous waste disposal--hazardous wastes in excess of 100 pounds or 30 gallons must meet criteria established by the State Department of Health and Environmental Science prior to disposal. South Dakota requires Department of Health approval of any hazardous or toxic waste at a state landfill. Acceptance of a hazardous waste at a site in Utah is determined on a case-by-case basis with regard to immediate and long-term protection. And the Department of Health in Wyoming must give a written approval prior to a hazardous waste disposal at a site in that state.

Table 2-47 summarizes the state regulations for sanitary disposal in the West. According to this table, most western states regulate seepage to underground strata, surface water pollution, control of wind blown debris, open burning, and uncovered debris.

2.12 NOISE POLLUTION

Of the range of environmental impacts from energy developments, noise pollution has probably received the least attention. Although noise is an output of a variety of energy technologies, including such facilities as mines, power plants, and transportation modes, concern about noise as a pollutant has grown very slowly. To some extent, this lack of attention can be traced to the fact that noise pollution is not directly related to energy activities--at least excessive noise is not as closely tied to energy shortages as air and water pollution and the management of solid wastes are. In many ways, noise pollution controls are more closely tied to the general regulation of occupational health and safety.[1]

2.12.1 Federal Controls

2.12.1.1 Legal Framework

It was not until the late 1960's, when air craft noise control regulations were promulgated, that the federal government

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[1] Branscomb, Lewis M. "Noise Control for the Future." Noise Control Engineering, Vol. 4 (January/February 1975), p. 15.

TABLE 2-47. STATE CONTROLS FOR SANITARY WASTE DISPOSAL

State	Controls				
	Seepage to Underground Strata Prohibited	Surface Water Pollution Prohibited	Control of Rodents, Dust, Odors, etc. Required	Open Burning Prohibited	Proper Covering of Debris Required
Arizona	✓	✓	✓	✓	✓
Colorado		✓	✓	✓	✓
Montana	✓	✓	✓	✓	✓
New Mexico			✓	✓	✓
North Dakota	✓	✓			
South Dakota	✓	✓		✓	✓
Utah			✓	✓	✓
Wyoming	✓	✓	✓	✓	✓

moved to legislate against noise pollution. After the passage of the 1969 National Environmental Policy Act[1] guaranteed that noise would be one of the problems considered in "major federal actions," it was a short step to the Noise Pollution and Abatement Act of 1970.[2] This law established, within EPA, an Office of Noise Abatement and Control, to report to Congress on the effects of noise on public health and welfare. That same year, the Occupational Safety and Health Act[3] was enacted to protect worker health and safety (including noise controls). By 1971, under the authority of this legislation, the Labor Department had issued the first noise exposure standard. The year 1970 also marked the passage of the Federal-Aid Highway Act,[4] which mandated the implementation of noise control design standards for highways.

The most important federal legislation relating to noise was enacted in 1972. The Noise Control Act[5] established the the requirements for EPA monitoring, standard-setting and enforcement of all federal noise control and research.

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[1] National Environmental Policy Act of 1969, Pub. L. 91-190, 83 Stat. 852.

[2] Noise Pollution and Abatement Act of 1970, Title IV of Clean Air Amendments of 1970, Pub. L. 91-604, 84 Stat. 1709.

[3] Occupational Safety and Health Act of 1970, Pub. L. 91-596, 84 Stat. 1590.

[4] Federal-Aid Highway Act of 1970, Pub. L. 91-605, 84 Stat. 1713.

[5] Noise Control Act of 1972, Pub. L. 92-574, 86 Stat. 1234.

2.12.1.2 Administrative Authority

Under the authority of the Noise Control Act, the EPA is required to identify major noise sources, noise criteria, and noise control technologies, to set noise emission standards for products and aircraft, and to establish product labeling for noise generating characteristics. Other federal agencies which have a major role in administering noise control regulations are: the Department of Labor, which sets OSHA standards; the Department of Transportation (DOT), which regulates aviation and highway noise limitations; the Department of Housing and Urban Development, which establishes its own noise criteria for federal housing loans; the DOD, which regulates its own internal operations, and the General Services Administration, which promulgates noise standards for the construction of federal buildings.[1]

2.12.1.3 Regulatory Provisions

As was discussed above in the section on the control of occupational health and safety, OSHA is responsible for the establishment of noise control standards relating to worker safety and health. Table 2-48 outlines the current OSHA noise standards. If these criteria are exceeded, some protection must be provided against the effects of noise exposure. In addition to the standards listed in this table, noise from brief impulses or impacts must not exceed 140 decibels, under OSHA rules.

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[1] Lang, William W. "The Status of Noise Control Regulations in the USA." Noise Control Engineering, Vol. 5 (November 1975), p. 109.

TABLE 2-48. FEDERAL NOISE CONTROL STANDARDS

Noise Duration (Hours per Day)	Maximum Sound Level (Decibels)
15 minutes	115
30 minutes	110
60 minutes	105
90 minutes	102
2 hours	100
3 hours	97
4 hours	95
6 hours	92
8 hours	90

Following its Report to Congress on Noise in 1972 (as a part of the requirements of the Noise Pollution and Abatement Act of 1970),[1] EPA was able to accumulate an adequate data base on noise reduction technologies and noise reduction criteria. Thus, in 1973, the EPA published its first "Criteria Development"[2] documents, which provided a partial basis for noise standards and regulations. In 1974, the EPA published its "Levels Document"[3] which identified noise levels which would pose risks to public health and welfare without regard to cost or technical feasibility for reducing these noise levels.

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[1] Noise Pollution and Abatement Act of 1970, Title IV of Clean Air Amendments of 1970, Pub. L. 91-604, 84 Stat. 1709.

[2] U.S., Environmental Protection Agency, Office of Noise Abatement and Control. Public Health and Welfare Criteria for Noise. Arlington, Va.: Environmental Protection Agency, 1973.

[3] U.S., Environmental Protection Agency, Office of Noise Abatement and Control. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. Arlington, Va.: Environmental Protection Agency, 1974.

Since 1974, the EPA has developed and submitted proposed noise standards for aircraft and motor carriers. In addition, the EPA identified as major product sources of noise medium-weight and heavy-duty trucks and portable air compressors. Proposed regulations have also been published for these noise sources.

2.12.2 State Controls

An important aspect of the Noise Control Act of 1972[1] is the division of powers between the federal, state, and local governments. Although the federal government has authority over interstate noise control (primarily aimed at common carriers) and new permits, the states and their subdivisions have the responsibility to determine acceptable community noise levels. However, most states have taken the position that most noise pollution should be controlled at the local level.

In the West, three states (Montana, South Dakota, and Utah) have no statutory regulation of noise pollution. Two states (Arizona and New Mexico) have as their only noise statute a section requiring every motor vehicle to have a muffler. Wyoming's noise control statute authorizes the local governments to regulate noise pollution. And in North Dakota, the legislature has requested that the state Health Council propose regulations for noise pollution control.

Colorado has by far the most comprehensive noise control standards in the West. Primarily, Colorado's noise control methodology is based on the incorporation of ambient noise standards so that nuisance action can be definitive and less subjective. Noise regulations are set by local governments, with maximum levels being prescribed by state statute.[1]

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[1] Noise Control Act of 1972, Pub. L. 92-574, 86 Stat. 1234.

2.13 TRANSPORTATION AND DISTRIBUTION

The control of the products of energy resource development focuses upon two closely related activities: transportation and distribution. Transportation controls include the establishment of user access and user rates, while distribution controls involve the regulation of product pricing and allocation.

2.13.1 Federal Controls

2.13.1.1 Legal Framework

Railway rights-of-way are controlled by enactments passed in 1875 and 1899.[2] Under the 1875 act, railroad companies which are chartered by a state or territory can unilaterally claim easements of 200 feet through public lands. National forests are exempt from this legislation, but are covered by the 1899 law which grants rights-of-way if "public interests will not be injuriously affected." The DOI controls the implementation of these acts.

Highway rights-of-way across public lands are authorized by statute only if the land has not been previously reserved for public use. An act passed in 1901 provides for highway rights-of-way across Indian lands.[3]

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[1] Colorado Revised Statutes, § 25-12-101 et seq. (1973).

[2] 18 Stat. 482; 30 Stat. 1233.

[3] 31 Stat. 1084.

Of more recent origin are the statutes controlling pipeline rights-of-way. Under the Mineral Leasing Act of 1920,[1] the Secretary of the Interior is authorized to prescribe regulations for oil and gas pipeline rights-of-way on public lands. The act does not provide for authorization of pipelines on acquired lands. By 1935 amendment,[2] the Secretary must find the pipeline to be in the public interest and a common carrier.

Provisions for pipelines do not explicitly mention the relatively new coal slurry pipeline technology. However, since the Act of February 15, 1901[3] gives the Secretary of the Interior power to grant rights-of-way to "pipes and pipelines" generally, permits have been given under this Act.

Federal jurisdiction over electrical transmission systems dates from the 1920 Federal Water Power Act[4] as amended by the Public Utility Act of 1935.[5] This legislation gave the FPC (now FERC) authoirty to regulate the rates and other aspects of interstate transactions in electric power.[6] Intrastate transactions are left to state utility commissions. The Commission (now Economic Regulatory Administration within DOE) has also influenced transmission network planning by encouraging utilities to join power pools and regional planning groups coordinated by the National Electric Reliability Council. Most of North and South Dakota is part of the Midcontinent Area Reliability Coordination Agreement, with the rest of the eight-state study area participating in the Western Systems Coordinating Council.

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[1] Mineral Leasing Act of 1920, 41 Stat. 437.

[2] General Leasing Act Amendments, Pub. L. 74-297½, 49 Stat. 674 (1935).

[3] 31 Stat. 73 (1901), 43 U.S.C.A. § 5 (1974).

[4] Federal Water Power Act, Pub. L. 66-280, 41 Stat. 1063 (1920).

[5] Public Utility Act of 1935, Pub. L. 74-333, 49 Stat. 803.

[6] See Cicchetti, Charles J., and John Jurewitz, eds. Studies in Electric Utility Regulation, A Report to the Energy Policy Project of the Ford Foundation. Cambridge, Mass.: Ballinger, 1975.

The federal regulation of user access and rates for interstate pipeline, railway, and highway transportation is established by the Interstate Commerce Act of 1887,[1] which created the Interstate Commerce Commission (ICC). The ICC's authority over transportation rates, corporate mergers, and competition has been broadened over the time with the passage of the Hepburn Act,[2] the Panama Canal Act,[3] the 1935 Motor Carrier Act,[4] and the Transportation Acts of 1920, 1940, and 1958.[5] However, the Railroad Revitalization and Regulatory Reform Act of 1976[6] reversed the trend by giving railroads more flexibility in pricing, completely freeing them from ICC jurisdiction in those cases where the railroads do not have "market dominance."[1]

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[1] Interstate Commerce Act of 1887, 24 Stat. 379.

[2] Hepburn Act, Pub. L. 59-337, 34 Stat. 584 (1906).

[3] Panama Canal Act, Pub. L. 62-337, 37 Stat. 560 (1912).

[4] Motor Carrier Act of 1935, Part II of Interstate Commerce Act Amendment, Pub. L. 74-255, 49 Stat. 543.

[5] Transportation Acts of 1920, 1940, and 1958, Pub. L. 66-152, 41 Stat. 456, Pub. L. 76-785, 54 Stat. 898, Pub. L. 85-625, 72 Stat. 568.

[6] Railroad Revitalization and Regulatory Reform Act of 1976, Pub. L. 94-210, 90 Stat. 31.

Energy product pricing and allocation controls began with the Water Power Act of 1920, as noted above. The 1938 Natural Gas Act[2] added to the FPC's responsibilities by giving the Commission authority over interstate natural gas sales.[3] Until 1954, however, the Commission dealt only with interstate transmission of gas, leaving production and gathering unregulated. The Supreme Court ruled in the Phillips case[4] that all gas "clearly following into interstate commerce" should be regulated, i.e., including production and gathering operations.

Federal petroleum allocation and pricing regulations were established by the "Phase 1-4" wage and price controls which applied to most goods and services during 1971-1973. These controls were extended for petroleum and its products by the Emergency Petroleum Allocation Act of 1973[5] and the Energy Policy and Conservation Act of 1975.[6] The Federal Energy Administration (FEA) was created, in large part, to administer these petroleum allocation and pricing mechanisms (by the Federal

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[1] Defined by ICC at 49 C.F.R. § 1109.1.

[2] Natural Gas Act, Pub. L. 75-688, 52 Stat. 821 (1938).

[3] See Breyer, Stephen G., and Paul W. MacAvoy. Energy Regulation by the Federal Power Commission. Washington, D.C.: Brookings Institution, 1974.

[4] Phillips Petroleum Co. v. Wisconsin, 347 U.S. 672 (1954).

[5] Emergency Petroleum Allocation Act of 1973, Pub. L. 93-158, 87 Stat. 627.

[6] Energy Policy and Conservation Act of 1975, Pub. L. 94-163, 89 Stat. 871.

Energy Administration Act of 1974[1]). Then the regulatory functions of the FEA, FPC, and other energy agencies were transferred into the new DOE by the 1977 Department of Energy Organization Act.[2]

2.13.1.2 Administrative Authority

Overall responsibility for federal transportation regulation is vested in the DOT and its operating administrations. The DOT has a division for planning and safety aspects of each of the major transportation modes but, as noted above, the economic controls for transportation and distribution of energy products are assigned to other federal organizations (see Table 2-49).

The administrative authority for granting rights-of-way across federal lands belongs to the DOI. However, in doing so, DOI must gain the approval of other departments having jurisdiction over the land in question. The Secretary of the Interior's discretionary authority is further limited by requirements to allow public hearings and "finding of facts" prior to the granting of permits. Federal regulated carriers of electricity and natural gas can obtain rights-of-way across private lands through exercising the power of eminent domain under

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[1] Federal Energy Administration Act of 1974, Pub. L. 93-275, 88 Stat. 96.

[2] Department of Energy Organization Act, Pub. L. 95-91, 91 Stat. 565 (1977).

TABLE 2-49. FEDERAL TRANSPORTATION AGENCIES

	Planning	Safety[a]	Ratemaking
Barges	Army Corps of Engineers	Coast Guard[b]	Interstate Commerce Commission
Pipelines	Department of Energy	Office of Pipeline Safety[b]	Department of Energy
Power lines	Department of Energy	–[c]	Department of Energy
Trains	Federal Railway Administration[b]	Federal Railway Administration[b]	Interstate Commerce Commission
Trucks	Federal Highway Administration[b]	National Highway Traffic Safety Administration[b]	Interstate Commerce Commission

[a] The National Transportation Safety Board investigates accidents in all transport modes and makes recommendations on safety measures.

[b] Department of Transportation

[c] Rules for lines crossing federal lands jointly prescribed by Secretaries of Agriculture and Interior; state authority on other lands.

federal statute.[1] Other carriers, such as oil pipelines, rely on state eminent domain laws.

The DOE brings together the many fragmented energy product pricing and allocation functions formerly vested in the FEA, FPC, DOI, and ICC. From the FEA, the DOE assumed responsibility for oil pricing and allocation. Natural gas regulation and interstate wholesale electric rate setting were transferred from the FPC to the new agency. Authority over the power marketing functions of the Bureau of Reclamation and the Bonneville Power Administration (as well as others operating outside the eight-state area) were transferred from DOI. And the functions related to transportation of oil by pipeline, including pipeline valuation and rate setting, were moved from the ICC to the DOE.[1]

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[1] University of Tulsa, National Energy Law and Policy Institute. The Legal and Regulatory Issues of Transporting Coal by Slurry Pipeline, OTA-E-60. Washington, D.C.: U.S., Congress, Office of Technology Assessment, 1978, Vol. II, Part 2, pp. Em-16 through EM-18.

The new DOE administrative structure controlling these transportion and distribution activities features a line administration and an independent commission. The Energy Resource Administration (ERA), a major line administration of the DOE, will assume the oil pricing and allocation programs of formerly administered by the FEA. And the FERC, an independent five-member commission within the DOE, will assume most of the transferred FPC and ICC functions.

2.13.1.3 Regulatory Provisions

The regulatory functions of the ERA include: assuring the availability and regulating the pricing and allocation of crude oil, natural gas liquids, and their products; ensuring market competition; intervening before FERC and other federal regulatory agencies; intervening before state utility regulatory proceedings; regulating natural gas and electric power imports and exports; establishing natural gas curtailment priorities; assuring the voluntary compliance of electric utilities; performing long-range utility planning; and performing non-FERC oil pipeline regulation.

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[1] Bachman, W.A. "DOE Takes Command of U.S. Petroleum Destiny." Oil and Gas Journal, Vol. 75 (October 3, 1977), pp. 47-52.

[2] Corrigan, Richard. "Congress Takes a Chip Off Carter's Energy Block." National Journal, Vol. 9 (June 11, 1977), pp. 888-92.

The FERC is charged with the following regulatory functions: issuing and enforcing licenses for hydroelectric power projects; establishing and enforcing rates and charges for the interstate sale and transmission of electricity and for the nonemergency interconnection of facilities for the generation, transmission, and sale of electricity; establishing and enforcing rates and charges for the interstate transmission and sale of natural gas; issuing and enforcing certificates of public convenience and necessity for the construction of facilities, abandonment of services, etc.; establishing and enforcing curtailments of natural gas; and regulating mergers and securities acquisitions under the Natural Gas Act[1] and Federal Power Act.[2]

The ICC oversees a system of "common carriage," by which transport operators are required to furnish their services to all who seek them at reasonable rates, and under equal terms for all shippers, commodities, and locations which are similarly situated. Other functions include authorizing new routes and services, authorizing abandonments, and overseeing corporate changes such as mergers and bankruptcies.

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[1] Natural Gas Act, Pub. L. 75-688, 52 Stat. 821 (1938).

[2] Federal Water Power Act, Pub. L. 66-280, 41 Stat. 1063 (1920).

2.13.2 State Controls

State laws generally control (a) distribution matters in intrastate commerce, (b) right-of-way matters for oil and coal slurry pipelines,[1] and (c) right-of-way matters for intrastate gas pipelines and electric transmission lines.

The greater part of electricity sales come under state regulation, whereas most natural gas sales are federally regulated.[2] State utility commissions generally use the same types of criteria for "reasonable" and "nondiscriminatory" ratemaking as does the FERC.

Both states and national constitutions provide for the protection of individuals against government action to take property. In general, state laws are more restrictive with regard to the taking of private lands for eminent domain purposes. Usually, the states require that a "public purpose" must be demonstrated for the exercise of eminent domain. The degree of public purpose varies with the states. Some states allow only bona fide public utilities or common carriers to use this procedure, whereas others extend the privilege to special situations in mining operations. An important difference between state and federal jurisdiction is that state law may require that a public purpose be served within the state, e.g., loading or discharge of the payload. This is one of the reasons behind proposals for federal jurisdiction over coal slurry pipelines. In the West, special privileges for eminent domain are extended to include pipelines and railroads, mine/mill operations, and water courses in every state, as is illustrated in Table 2-50. In addition, some states provide for eminent domain for tramways and transmission lines. And, as is indicated by Table 2-51, there is a wide variation in the state regulations for electricity transmission.

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[1] Legislation (Senate Bill 707 and Senate Bill 1492) has been introduced to grant federal eminent domain powers to coal slurry pipelines.

[2] Breyer, Stephen, and Paul MacAvoy. Energy Regulation by the Federal Power Commission. Washington, D.C.: Brookings Institute, 1974, p. 11.

Several of the western states have brought the entire energy development system, including transportation, under a comprehensive administrative umbrella.[1] In these states, siting commissions approve routes in conjunction with consideration of the energy conversion facilities they serve.

2.14 CONCLUSIONS

The above sections summarize the federal and state laws and regulations applicable to development of all the resources discussed in the subsequent chapters. These summaries are up-to-date as of late 1977 with more up-to-date material included when available.

In the subsequent chapters on each resource, laws and regulations applicable only to that resource are identified. For a complete coverage of laws and regulations applicable to a particular technology and a particular resource, both this

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[1] These states include Arizona, Montana, New Mexico, and North Dakota. Southern Interstate Nuclear Board. Power Plant Siting in the United States. Atlanta, Ga.: Southern Interstate Nuclear Board, 1976.

TABLE 2-50. STATE EMINENT DOMAIN CONTROLS

Category of Use	State							
	Arizona	Colorado	Montana	New Mexico	North Dakota	South Dakota	Utah	Wyoming[a]
Pipelines								
Oil	✓		✓	✓	✓[b]	✓	✓	
Gas	✓[c]		✓	✓	✓[b]	✓	✓	
Coal Slurry				✓[d]	✓[b]		✓	
Generally		✓	✓					✓
Railroads	✓	✓	✓	✓	✓	✓	✓	✓[e]
Roads								
Mine/Mill Operation	✓[f]	✓[f]	✓[f]	✓	✓	✓[f]	✓	✓
Water								
Generally	✓	✓[g]	✓[h]	✓	✓	✓	✓	✓
Mines	✓[i]	✓	✓	✓	✓	✓	✓	✓
Tramways		✓	✓	✓			✓	✓
Transmission Lines		✓	✓	✓	✓	✓	✓	✓

[a] Not over 100 feet each side; except mine haul roads not to exceed a total of 100 feet in width and must be in good faith and economical to mine.

[b] Only if the pipeline company is a common carrier and follows the statutes and regulations of the state.

[c] Only an authorization of gas lines to the consumer or for gas company interconnection lines.

[d] From mine to processing transporation only.

[e] To include spurs for coal mines.

[f] Authorizes roads, tunnels, or canals for mine tailing removal.

[g] Only if associated with a public service or benefit.

[h] State requires that for reservoir construction by eminent domain the District Court must find the reservoir to be the highest and best use of the land.

[i] Also provides for canals providing reclamation water.

TABLE 2-51. STATE ELECTRIC TRANSMISSION CONTROLS

State	Controls
Arizona	License required for construction of all lines over 115 kV, public hearings required.
Colorado	License required in most instances, public hearing held if requested.
Montana	License required for all lines; hearings at the discretion of commission.
New Mexico	License and hearing required for all lines.
North Dakota	License required for construction of all lines above 115 kV, public hearings required, but shortened procedures available at commission discretion.
South Dakota	No legislation.
Utah	License required for all lines; hearing is discretionary.
Wyoming	License required for all lines; hearing is discretionary.

kV = kilovolts

chapter and the social controls section related to that technology and resource should be consulted.

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